

AUTOMOTIVE INDUSTRIES

The AUTOMOBILE

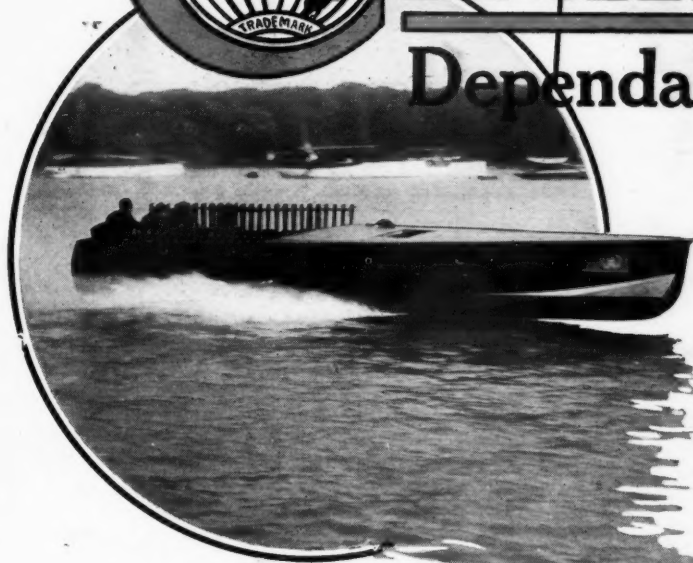
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The AUTOMOBILE

VOL. XLV.

NEW YORK—THURSDAY, OCTOBER 6, 1921

No. 14

Foreign Automotive Markets Ripe for Attention

Appreciated exchange and growing recognition of the automobile as a utility awaken renewed interest in foreign trade. Plans must be made far in advance of actual business if future sales are expected.

By George E. Quisenberry*

DURING the next few months the American manufacturers of automobiles and automotive equipment must determine their policies and their attitude in regard to international trade. With a gradual but none the less positive improvement in our foreign trade indicated by practically every report from the centers making up our overseas markets and with the exporters of automotive equipment generally sensing a coming resumption of business on a broader scale, the fixing of these policies and the methods of going after the trade assumes an immediate importance. Plans must be made now for business desired next summer.

Export markets have received little attention recently except from those few companies which overloaded their foreign dealers and faced rejected shipments or uncollected accounts in foreign ports. But other companies have given little attention to their overseas trading and are now confronting a time when their decision must be made. Time is pressing.

The domestic situation for months has been so difficult and so tangled that the manufacturers have had no time to devote any efforts to other markets. Foreign trade was accorded but little thought. This part of the business was due for a slump and the natural tendency of the manufacturers was to neglect it be-

cause of the seriousness of the domestic troubles.

But as the domestic situation has changed, so have the overseas markets. The home markets during the last four or five months have been larger than was expected, so that even the closest observers of the industry and those who best know its strength have been surprised. Car and accessory sales in many cases have exceeded expectations and the result has been a consequent lessening of the domestic worries.

Furthermore, international business has begun to pick up. This is shown by the July and August overseas shipments. July revealed an increase over June, so far as car sales were concerned, and August was better than July. The increases were small, indeed, but they were increases, none the less, and give promise of the better markets that may be expected as the year turns and as general business improves.

Foreign exchanges, leaving out those of Central Europe, have shown a steady appreciation for many countries. The pound sterling has appreciated materially and the improvement in some of the Latin-American currencies has been such that the pessimism in those countries has suffered a severe jolt. The Indian rupee and the Chinese currencies are advancing steadily and Bombay has come back into the gold market as a buyer, indicating a better and more

*Managing Editor, *El Automóvil Americano*.

satisfactory financial condition in that great British territory. These straws in the winds of prophecy point the way that general business is going.

Mexico is a heavy buyer of automotive products and for some months has been the leader of all countries of the world. Cuba, despite the seriousness of the sugar situation, has not ceased to purchase. Peru, her stocks of cars wiped out during the summer centennial celebration, forecasts better conditions as cotton prices have gone upward. Brazil is making numerous purchases and dealers there have given every indication that cars will still be bought from those companies willing to co-operate in meeting the temporary exchange difficulties. The annual automobile show in Argentina will be held in late November and, with better wheat demand and advancing exchange, the unsold cars there should dwindle and open that market in the coming year. Already Ford has reported increasing business from Buenos Aires and the future appears much brighter, particularly since the \$50,000,000 Argentine loan was announced in New York.

Australasia is buying again and some business is moving to the Straits. South Africa, like Australia, is immensely helped by the betterment of the pound sterling and banking connections in that great section of the world report an improved financial condition. The Far East can be judged by the advancing exchange, the Shanghai tael and other currencies having risen materially as general commerce has bettered perceptibly.

In addition, ship space is in greater demand and the operators report, in their current journals, a larger volume of loading in many ports. The great wheat exports that have been going out of the North American ports since the harvest began indicate a similar movement from the other grain growing countries, such as Argentina, when their crops come in. These things, taken together with the statements of such responsible business men as Hoover, show that business as a whole has improved and that better conditions in foreign trade are in the making.

This upward trend means much to the automotive industries, whose foreign trade is just at the threshold of its development. The foreign markets in the developing countries of the world have seen no more than the start of their automotive purchases. In 1920, by counting Ford production in the various foreign assembly plants, the world purchased approximately 200,000 American-made motor cars and trucks, although few countries received anything like as many as would have been absorbed if delivery had been possible.

New uses for the automobile, the truck and the tractor are being found in these countries and new services opened up for them. Roads are being built and improved in countless sections in a greater amount than for many years. The automobile is being used as an essential and necessary means of transportation, its utility broadening so that it is no longer sold merely as a luxury. It is being put to work, doing its valiant part in upbuilding vast economic, industrial and agricultural resources in many territories.

That these territories have been under a business cloud for twelve months or more means nothing fundamentally and is no argument against their future trade in American-made automotive products. We have proved the automobile here at home and its worth in a thousand services has been so demonstrated that, even in the midst of such a year as 1921, production on a high scale has been necessary to meet the insistent demands of a public requiring transportation.

Why will not this same condition prevail in other countries of the world? These countries may not have realized the automobile fully as yet, they may be in the midst of a temporary depression that brings with it pessimism and gloom and, yet, having no more than scratched the rich natural resources that are theirs, it is inevitable that they shall have need for the transportation services of the automobile as we know it in America.

Thus, we have come to the immediate problem of the automotive manufacturer. Foreign business is ahead of him and destined to come his way if he will advance to meet it. The time was, perhaps, when it would seek him out. "Them was the days," we may say with regret, but we cannot expect them to return to-morrow

or the day after. The world has become shy and wise in parting with its dollars. The dollars are there, of course, and so is the buyer's appreciation of an honest product at an honest price, but those dollars can be coaxed out into the open only with fair dealing and honest service. Fundamental conditions have not changed, but the world has turned back to its pre-war state, realizing the worth of its money and demanding real value in return for it.

Foreign trade consists mainly of foresight and advance effort. It must be sought after and that to-day is of more importance than it perhaps ever has been. Work must be done long before the consummation of the business. The manufacturer or exporter cannot go out to-day and have a volume of business to-morrow. By going out to-day, with merchandising plans carefully made and forcefully followed, sales may be well under way in five or six months, but the time element must be considered. So it is not too early to start now after the trade that should come in next spring and summer from every corner of the world.

The problem of merchandising abroad does not differ materially from that at home. It is different only in minor points and the merchant who has a satisfactory domestic policy will also have a suitable foreign policy, provided the varying points are recognized and allowance made for them. These, after all, are only detail and need not affect the broad general principles of satisfactory service and fair dealing. Too many manufacturers think of foreign trade as something apart from their regular business, something mysterious and something shrouded in uncertainty.

Foreign trade is simply an extension of sales and sales effort across the national border lines and into another country. At bottom, trading methods in each section are similar and this may be especially stressed in view of the great body of automotive dealers who have

RECENT years have thrown the American automotive industries into international trading. American-made cars and trucks have been distributed throughout the world. These export markets are re-opening. Can American makers hold them? How can they prevent this business from going elsewhere? These questions are fully discussed in this article which has been written after a careful study of present conditions.

been organized in the different foreign centers, a body of size and significance not generally realized. This development is taking place along the same lines as in America and the same factors apply to it. Consequently, successful firms at home can just as well go after foreign trade as domestic. With the facilities of service, information, credit ratings, etc., existing at present, manufacturers can go into this profitable branch of the automotive industry with full certainty that careful dealing on their part will be just as well received and just as productive of fortunate results as it would be in Pennsylvania, California or Texas.

World trade in automobiles and automotive equipment is again in the making. The post-war armistice period has passed and we are definitely progressing into the after-war development and prosperity. And the American manufacturer goes into this new period with the weather vanes all pointing his way.

Our cars and our equipment during recent years have gone to all parts of the world and the idea of the essential vehicle of transportation, efficiently produced and efficiently serviced, has attained a firm footing. Europe has but little competition worthy to challenge the automotive products from this country. No cars of the medium and lower-priced ranges are being built in Europe. It will be long before the proposed light cars being put into production by French and British makers are made in great enough quantities to be serious competitors from a price standpoint. Quantity production is practically unknown and the higher-priced cars of Europe are in competition with those of America only because the Europeans have been better at propaganda and sales efforts than have our own exporters. Certainly, no one who has had an opportunity to know, will admit that the high-priced products of the other

side are equal in quality to those built here and, that, despite the present conditions of exchange, price competition with the American products is possible in only a few countries and on only a comparatively small number of models. Conditions somewhat differ in the accessory and truck lines, but here again the question is largely one of propaganda and efficient merchandising effort.

Europe is building for foreign trade with passenger car shows in London, Paris, and Berlin. Much stress is being laid on the attempts of the continental manufacturers to build their cars along American lines. Production in these countries is, of course, freer than at any time since the war began, and the makers are now in a position to go after international trade. These factors must be taken into consideration by American manufacturers whose cars and trucks are to go into the foreign market against unlimited competition.

There are American automobile, truck and equipment companies to-day which are merchandising their products in the foreign fields with skill, fair play and intelligence. Our pioneer foreign traders have done their work well and their efforts are worthy of place among the best. These firms have no fear of the future of their export sales and they are just as keen on the foreign markets now as they were one, two or three years ago, knowing that this trade will take a considerable volume of production and knowing likewise that, with care and ability, a profitable and desirable business is assured in response to their foreign effort.

With these markets reopening, American factories must determine their stand on export trade and work out their policies in regard to it. Weeks and months are required to reach distant centers of distribution, and dealer organizations cannot be built up by the mere desire to have them. Something more is required—the business will and ability to go after the trade.

S. A. E. Working on Material and Other Standards

THE Subdivision on Wrought Non-Ferrous Metal Alloys of the Society of Automotive Engineers' Standards Committee is considering specifications covering brass forging rod, brass spring wire, naval brass, or, as it is sometimes called, Tobin bronze tubing and phosphor bronze spring wire. If these specifications are adopted by the society, the S.A.E. Non-Ferrous Metal Specifications, of which there are now 25, will cover a sufficiently wide range to permit automotive vehicle designers to select standard specifications for practically any automotive purpose for which non-ferrous metals are used. The specifications proposed cover, in addition to the compositions in percentage specified, the physical properties, appearance, dimensional tolerances and general information of interest to engineers and manufacturers.

Desirable Plate-Glass Practice

In many cases body designers have specified plate-glass window widths without regard to the commercial practice of manufacturing plate glass in even 2-in. widths. Waste can frequently be avoided by a slight change in the window design. It is, of course, cheaper to use a 19¾-in. width in place of a 20¼-in. width, because the first size can be made from 20-in. glass, while the second size is cut from 22-in. stock, since no intervening size is regularly manufactured.

Realizing this situation, a report has been formulated,

at the request of the Passenger Car Body Division of the S. A. E., which recommends that plate glass for automobile bodies shall be specified in even 2-in. widths in accordance with commercial practice if possible. It is also recommended that the thickness of plate glass should be specified in fractions of an inch, the maximum variations of thickness of any single piece of glass not to be greater than 1/32 in. in order to prevent the glass from being tapered. The report also recommends that the thickness of plate glass for windshields shall be ¼ plus or minus 1/32 in. and the thickness of plate glass for closed body windows shall be 3/16 plus or minus 1/32 in.

Pressure Gage Standardization

At the next meeting of the S. A. E. Screw Thread Division a preliminary report for pressure gage connections will be acted upon. The principal dimensions specified in the report are the diameter and the threads per inch of the air connection at the back of the instrument. The report has been approved by pressure gage, as well as passenger car and motor truck manufacturers. The general adoption of the recommendation will make pressure gages interchangeable, as there is already a standard for the outside diameter of the instrument case and the location of the holding screws, when these are used.

Important Changes Feature the New Jordan Model

A new design of Continental engine, made exclusively for the Jordan company, incorporates chain drive and hollow shaft lubrication. Frame has been stiffened and several refinements in coachwork made. New single plate clutch is employed. Exposed metal parts are rust-proofed.

By J. Edward Schipper

AN entirely new Jordan car has recently been put in production. While the chief components are still manufactured by parts makers, most of them now are largely of Jordan design and are found in the Jordan car exclusively. An example is the new Continental engine, which will be made only for the Jordan.

While the foundation for the new design has been the previous Jordan model, many improvements have been made, and the resulting product differs materially from its predecessor.

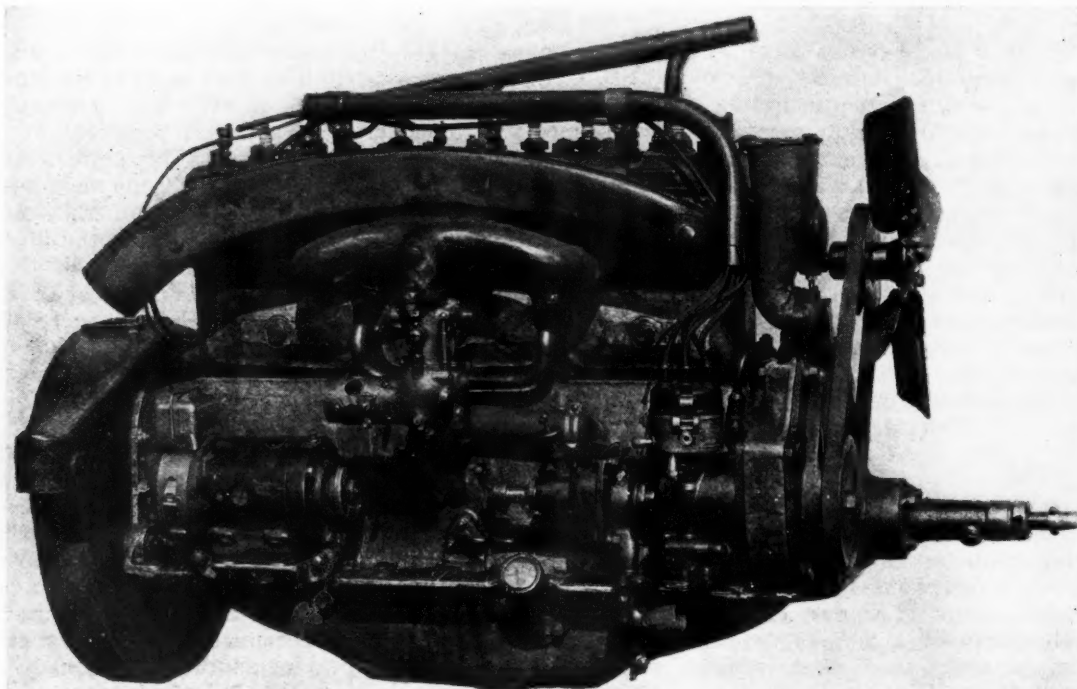
The frame of the car has been stiffened. If the frame of the older model were laid on the floor and two men stood on one side rail it was possible to raise the other side rail 1 or 2 ft. before the side bearing the men was lifted from the ground. With the new frame, the flexure under the same conditions would be only a few inches. The result is a considerable lessening in the weave of the frame and in the tendency of the body to develop squeaks and rattles. This result has been accomplished by extending the maximum depth of the side rails over a much greater portion of the length and by the use of tubular cross-members at both ends. These cross-

members are secured to the frame by riveting through steel castings which project into the tube and are keyed to it. Improved riveting and gusseting of the cross-members has also added to the rigidity of the frame.

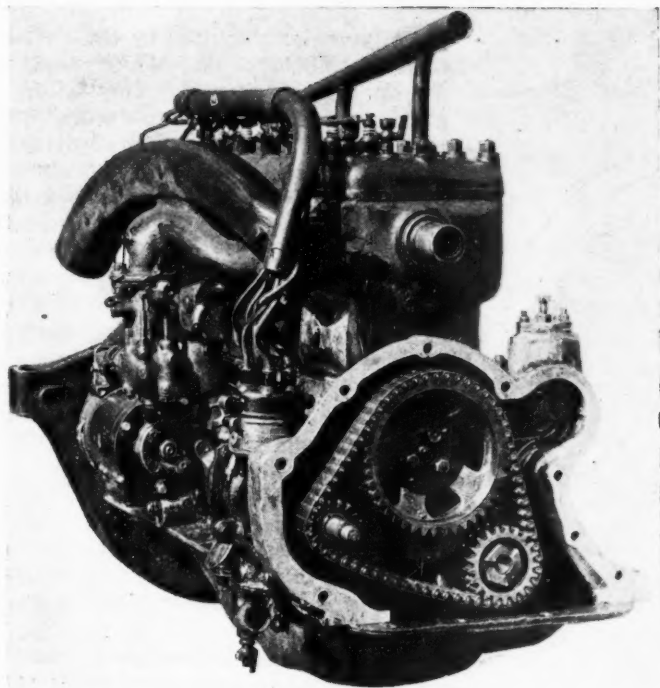
The new engine, which is made by the Continental Motors Corp., is supported at three points and is a block-cast, six-cylinder unit. The head, cylinder blocks and crankcase are cast separately; the flywheel housing is cast separately from the crankcase and is bolted to it. The cylinder head and cylinder blocks are of gray iron, and the crankcase and clutch housing are of aluminum. The engine is an L-head, four-bearing type of 3 5/16-in. bore and 4 3/4-in. stroke. The crankshaft is 2 1/2 in. in diameter, which is unusually large for this size of engine. This large diameter makes for rigidity of the crankshaft and prevents vibration. Freedom from vibration was evidenced by a test which the writer gave the car over varying roads in the vicinity of Cleveland. The compression pressure is about a 70 lb. per square inch absolute.

The cast iron pistons weigh 22 oz., are 3 15/16 in. in length and have three rings, all above the piston pin. The bottom piston land is chamfered and drilled to provide an oil drain. The piston ring widths are 3 1/16 in. and the piston pin diameter is 55/64 in. The piston pin bearing is in the top of the connecting rod, the pin being clamped in the boss and held by a lock screw which passes all the way through the pin and into the opposite side of the boss. In addition to this method of locking the pin, another safeguard against creeping is provided in the form of registering grooves into which a spring ring is inserted.

The connecting rods are of I-beam section,



Right side of Jordan engine showing mounting of water pump-distributor unit, water manifold and large filler-breather device



Front end of Jordan engine showing new triangular chain drive

10½ in. in length, and are machined all over. The crankpin bearings are 2¼ in. in dia., and the main bearings are 2½ in. dia., except the front one, which is 2¼ in. By making the crankpin bearings lighter than the main bearings, the torsional vibration of the crankshaft is said to have been materially reduced. The connecting-rod caps are secured by two bolts of alloy steel. The lengths of the main bearings are, front to rear, 2⅜, 1 9/16, 1 9/16 and 3 1/16.

Silent Chain Drive

A new departure for the Jordan company is the use of silent chain drive at the front end of the engine. It is a triangular layout, the Morse chain passing over the crankshaft, camshaft and auxiliary shaft sprocket. Chain adjustment is made by swinging the auxiliary shaft outward until the proper tension is applied on the chain. This adjustment is accessible and the units driven by the shaft are so arranged that they are not affected by the adjustment. This auxiliary shaft carries the fan pulley in front of the chain case. Immediately behind the case are the vertical distributor shaft (driven by helical gears), the oil pump, water pump and the generator, the latter driven through two flexible couplings. The distributor, oil pump and water pump all move as a unit when adjustment is made. The rubber hose connection for the water pump and the two flexible shafts for the generator permit sufficient movement of this shaft to make any necessary adjustment of the chain without affecting the water feed or the generator drive. The forward part of the water pump body and the oil pump housing are in one casting, which gives a very compact arrangement and fits in well with this type of auxiliary drive.

The camshaft is mounted in four bearings, whose diameters and lengths are, front to rear: 2 5/16 by 23/64 in.; 29/32 x 1; 2¼ x 1 and 27/32 x 1½ in. The valves have 1 43/64 in. outside diameter and a lift of 5/16 in. and are operated by mushroom followers. The engine is timed to fire 1-5-3-6-2-4, and the valves are timed so that the exhaust opens 40 deg. ahead of the lower center and closes at 8 deg. past the upper center,

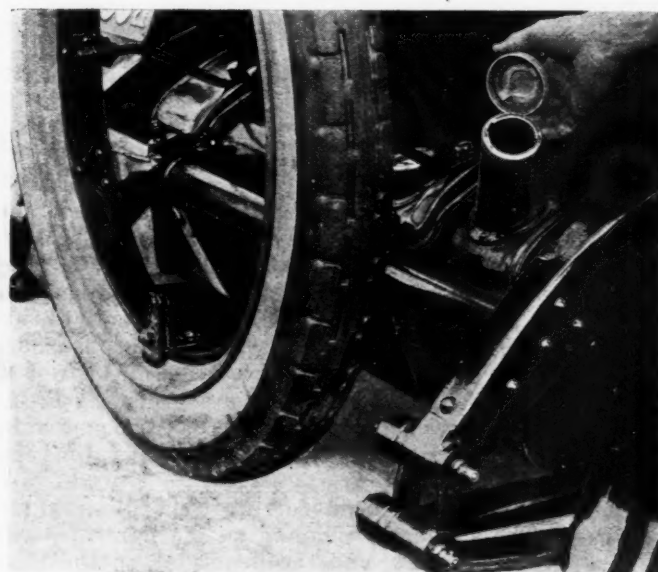
while the inlet opens 12 deg. past the upper center and closes 40 deg. past the lower center. The entire valve layout is designed to be particularly accessible. The valve tappet guides, for instance, can be removed without taking off the cylinder block, being held by clamps which are accessible when the cover plates are removed.

Water circulation is by centrifugal pump. The water system has a capacity of 4½ gal. The radiator is a Sparks-Withington cellular type and is supported in an original and interesting manner. It rests in a cradle consisting of a strap which passes entirely around the shell and clamps at the frame line. This method of mounting the radiator is similar to that employed in mounting the gasoline tank and seems to work out very satisfactorily, particularly in that it distributes the clamping stresses over the entire circumference. The water enters the engine jacket under the exhaust valves in two places and ample water space has been provided around the exhaust valves and spark plugs.

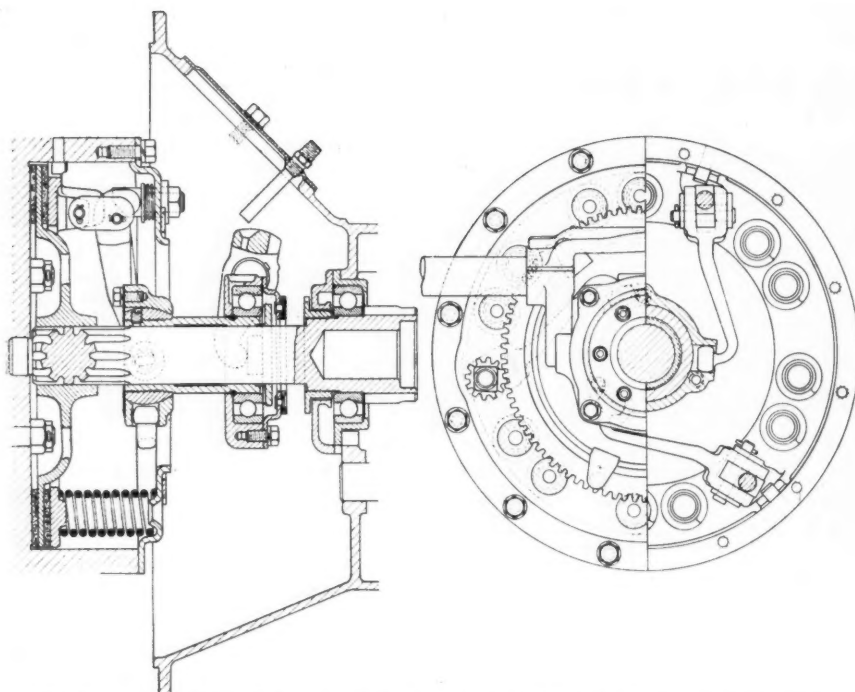
Hollow Shaft Lubrication

Oil feed under a normal pressure of 20 lb. to the sq in. is used for engine lubrication. The gear type of oil pump is driven from the bottom of the distributor shaft and forces the oil to a thin steel gallery tube which is cast in the crankcase. From this main tube there are feeder tubes to all main bearings where the oil passes into the hollow crankshaft. Drilled leads in the crankshaft conduct the oil to the crankpin bearings. The timing chain is lubricated by the overflow which is caught in a pocket at the front end of the main gallery tube and delivered directly over the chain. There is also a bleeder lead to the chain, and this unit operates continually in a bath of oil. The pressure regulator is located at the front end of the gallery tube and is easily adjusted to provide the proper tension on the spring pressure relief. An oil pressure gage is mounted on the dash and communicates with the rear end of the main gallery feed. One of the interesting points of the engine is the extremely large oil filler which is mounted at the front in such a way that oil can be readily poured into it without spilling. The oil passage has been made large enough so the oil may be poured into the crankcase as rapidly as desired. There is also a plainly visible dial type oil level indicator.

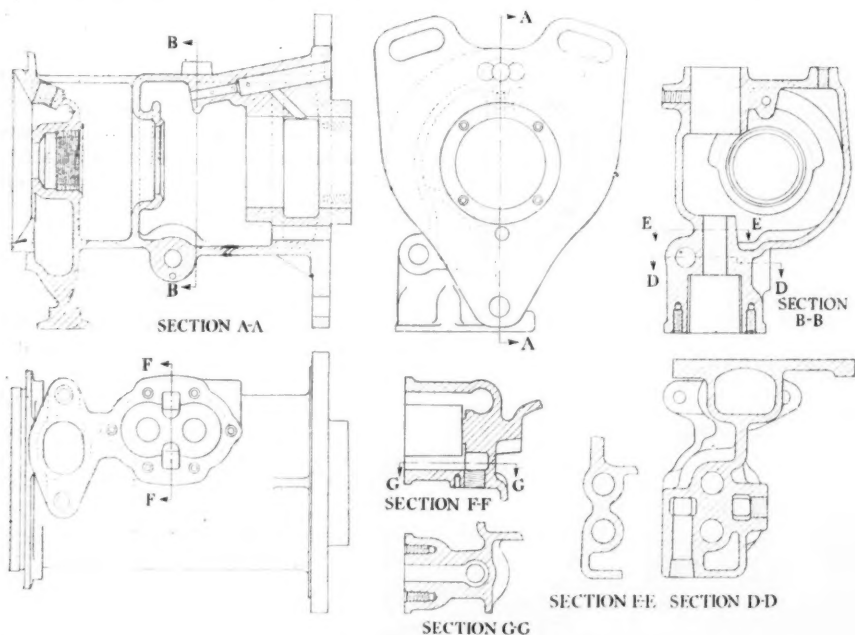
Fuel is carried in a 16-gal. tank of square section



Rear end of Jordan frame showing mounting for spare tire and gasoline tank, new filler cap with spring bayonet instead of thread, and non-rattling spring shackle



Sectional assembly of single dry disk type of clutch used in new Jordan car



Views of casting which encloses distributor gear drive and is part of swinging unit used to enable chain adjustment

mounted at the rear of the chassis between the frame rails. A new type of spring bayonet cap is used on the filler to prevent trouble with crossed threads. The gasoline is fed by vacuum to a 1¼-in. plain tube Stromberg carburetor. The intake manifold is a hotspot type, but somewhat less heat is applied than in the previous model, it having been found that in hot weather the power of the engine was slightly impaired by overheating of the intake. The new hotspot constitutes a compromise which is said to meet summer and winter operating conditions equally well.

Delco equipment is used for starting, lighting and ignition. The starter is mounted on the left side, with a pilot type mounting, and the generator on the right side at the end of the auxiliary shaft, as described. A separate pad is bolted to the crankcase and the generator is mounted on this pad.

The clutch is a new dry, single-plate type manufactured by the Detroit Gear & Machine Co., which concern also makes the gearset. This latter is a three-speed, selective unit, and has been improved from the driver's standpoint by lengthening the shifter lever. The ratios in the gearbox are 3.2 to 1 on low, 1.72 to 1 on second and 3.88 to 1 on reverse. The drive is through a hollow propeller shaft with two Spicer type universals. The rear axle is a new Timken floating design. Following a recent tendency in axle design, this new axle has a bearing on both sides of the pinion, supporting the pinion shaft. It is a spiral bevel type, providing a ratio of 4 2/3 to 1 for the closed bodies and 4 5/12 to 1 for the open bodies. The car is mounted on semi-elliptic springs 37 x 2 in. long in front and 56¼ x 2 in. long at the rear. A Gemmer steering gear is fitted.

While the new bodies are not materially altered in outline, they are considerably changed in detail and fittings. They are all mounted on the standard 120-in. wheelbase chassis. The standard tire size is 32 x 4 in. Some of the body details are novel and interesting. For instance, the louvres in the hood, instead of being on the outside, are on the inside, which is claimed to more effectively draw in the air from beneath the hood.

Close attention has been given to rust-proofing of the car. Practically every bolt and screw on the exposed parts of the body is of nickel-plated brass. This also applies to a large percentage of the hardware. The parts which are necessarily made of steel have been Parkerized.

The entire front compartment has been rearranged. There is a new instrument board in which all of the instruments are under one glass. The board has been cut away at both sides so as to provide a greater amount of knee room for the driver and the front seat passenger. The starting switch is now located on the toe board instead of near the front seat, so that

it is impossible for anyone to accidentally step on the starter button when entering the car. The switch plunger itself has a mushroom type head which prevents water from entering the switch parts.

Much has been done to prevent rattles and other noises about the car. The muffler is now a two-compartment instead of a single compartment type. The muffler tail pipe has been extended to the rear of the body so as to prevent any chance of exhaust impulses giving a drumming sound, particularly in closed bodies. The Jordan anti-rattle shackles, which are held under spring pressure, have been improved and are used on both the front and rear springs. The dashboard, which separates the engine compartment from the body, is backed with non-sonorous material to destroy resonance.

Grease cups, in more or less inaccessible positions, have been eliminated and oilless bushings substituted

wherever practical; where they are not practical, as on the brake shaft, a lead of flexible tubing has been brought back and clipped to the rear spring so that the Alemite attachment can be readily applied. The front end of the drag link, which was formerly packed with grease when assembled and not provided with any further lubricating means, has now been provided with an Alemite attachment.

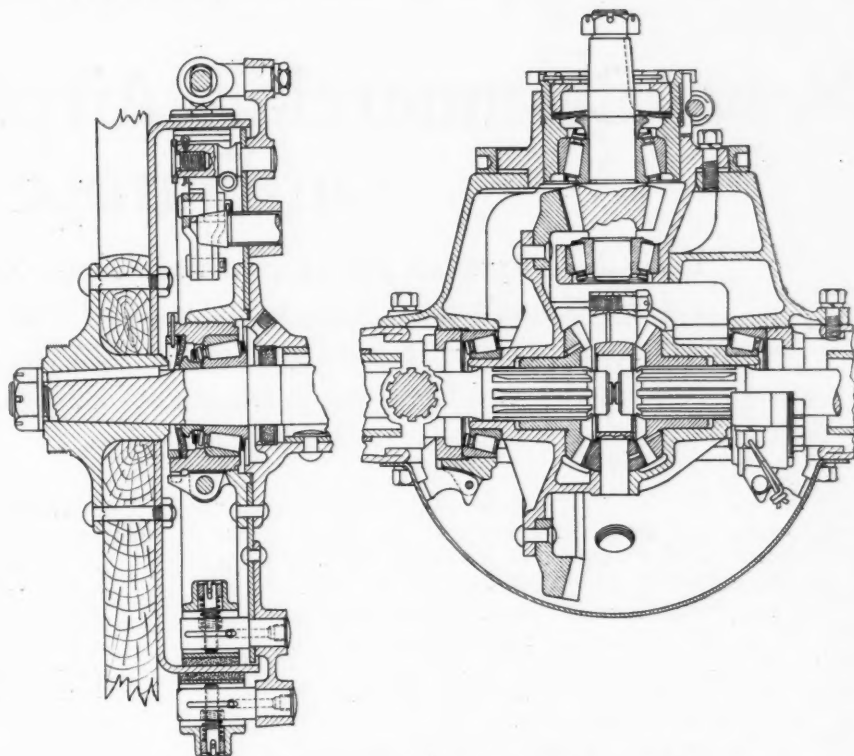
Detail Refinements

The small tools are now carried in a compartment in the left front door, which is provided with a steel door and padlock for protection. The tools are snugly fixed in the door so that they cannot rattle. A transmission lock projects above the floorboard and permits of locking the transmission in neutral by pushing down on the lock. The top is now secured to the windshield by means of a nut which gives a positive, non-rattling anchor. There is a cowl ventilator to cool the front compartment and the windshield has been made rain-tight by a new form of rubber stripping. The side curtains have been taken out of the top pocket and put in door compartments.

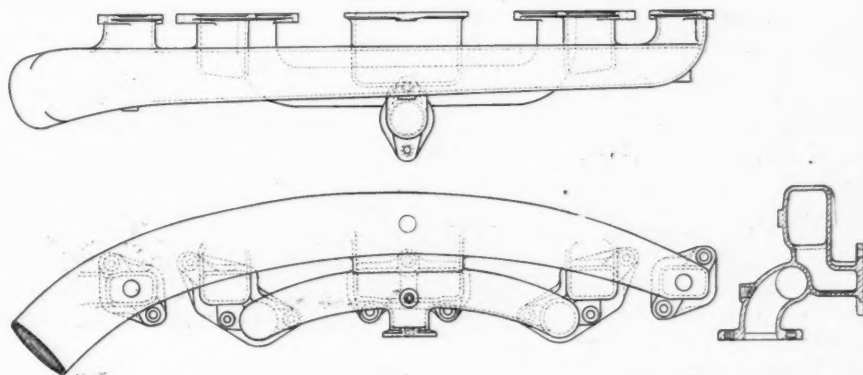
To render the seats more comfortable they have been lowered and tilted at a greater angle. Marshall cushions are employed.

The brake centers have been very carefully laid out so that the flexure of the spring does not affect the position of the brake pedal and brake lever on rough roads.

Jordan prices are as follows: Five-passenger touring car, \$2095; roadster, \$2,095; brougham, \$3,200; sedan, \$3,200; landaulet, \$2,595.



Sectional view of new Timken rear axle used on Jordan cars



Layout of intake and exhaust manifolds showing the new arrangement of hot-spot

Britons Agree on Type of Car for Export

B RITISH manufacturers, at a recent conference, agreed upon certain standards in building cars for export, some apprehension being felt in some circles over the slackening of foreign business. Pessimism was expressed at the meeting over the question of cost and it was realized that until labor and material were cheaper and methods of production improved upon England would be compelled to put forth strenuous efforts to keep pace with its competitors in motor exportation.

In agreeing upon the type of car to be exported the manufacturers decided that the chassis should be strongly sprung, with detachable wire wheels fitted with wide tires. The clearance should be at least 8 inches for small and 9 for large cars. The wheel track should be from 4 ft. 8 in. to 4 ft. 9 in. Less would mean that cars could not be run on the many back-country roads that are generally little else than parallel cart-ruts.

The ratio of power in the engine should be 1 hp. per cwt. of the completed vehicle. Detachable cylinder heads should be fitted. The radiator should be large, and the fan capable of varying speeds. The gasoline tank, with a

vacuum feed fitted, should be in the rear of the car. Lubrication should be by pressure feed. Magneto ignition is preferable, and the lighting system and self-starter should form part of the chassis. Gearing should allow of much hill-climbing on top speed. The rear axle should be of the full floating type, and the brakes and steering particularly strong.

In finishing, brass fittings should be cut out as far as possible, to ensure a minimum of cleaning. The body should be despatched minus the last coat of varnish. Thus freight damage can largely be put right after the car is unshipped. Plenty of elbow-room should be allowed for, as commodities as well as passengers would be carried.

I N a paper read before the Academie des Sciences, M. Mailhe described a process for manufacturing motor fuel from linseed and other vegetable oils by passing the vegetable oils over a special apparatus which deprives the oil of its water and hydrogen. The resultant volatile product is then passed over nickel, and M. Mailhe claims that it is then in all respects similar to gasoline.

New Commercial Airplane Designed in Europe

Rearward stagger of the wings a new feature as is a rectangular section fuselage containing a five-passenger cabin with pilot's cockpit forward. Although plane is of French design a 420 hp. British engine is used. New model embraces many features of other machines of same make.

By John Jay Ide

AMONG the foremost airplane designers in Europe to-day are the two directors of the Nieuport company—MM. Delage and Bazaine. In the design of the Model 29-C-1 pursuit machine and its development, the winner of the last Gordon Bennett race, they have added fresh laurels to the firm founded by that great genius, Edouard Nieuport. Had the war continued the 29-C-1 would have replaced the Spad XIII as the standard French single-seater fighter.

The latest product of the Nieuport company is the Model 30-T commercial airplane, equipped with a British Sunbeam "Matabele" 420-hp. engine. The reason for choosing a British engine is not known, unless it be that there is no French engine of the required power in production. There are a number of points in the design of the Model 30-T reminiscent of the earlier models of the firm. Among these are the ailerons on the lower wing only (undoubtedly the most efficient position when flying very low), the landing gear and the method of engine cooling by twin Lamblin radiators (described in AUTOMOTIVE INDUSTRIES, Oct. 21, 1920).

New features include the rearward stagger of the wings and the rectangular section fuselage containing a cabin for five passengers and a pilot's cockpit forward. The cabin is very comfortable and has good visibility, thanks to its eight windows.

Twelve-Cylinder Engine

The engine is of the 12-cylinder V type, developing 420 hp. at 2000 r.p.m. of the crankshaft and 1225 r.p.m. of the 4-bladed propeller. The cylinder dimensions are 4.8-in. bore and 6.3-in. stroke, giving a volume of 1368.7 cu. in. The weight of the engine with water but without fuel or oil is 1091 lb. The engine has two Claudel carbureters, the air being obtained by a scoop on each side of the fuselage, and the vertical exhaust pipe will be noticed.

The rod attached to the two outboard struts on the starboard side was used to carry the Pitot tube for indicating speed during the trials. Normally, of course, the speed is registered by means of the twin tubes seen on top of the upper plane amidships. Originally all control surfaces were balanced. After preliminary trials, however, the balanced portions of the ailerons were cut off.

The characteristics of the Nieuport 30-T are as follows:

Span (upper wing)	50.8 ft.
Span (lower wing)	47.5 ft.
Gap	8.5 ft.
Chord	8.5 ft.
Wing area (incl. ailerons)	700 sq. ft.
Aileron area	60.8 sq. ft.
Stabilizer area	64.6 sq. ft.
Elevator area	36.6 sq. ft.
Fin area	10.8 sq. ft.
Rudder area	15.1 sq. ft.
Weight (empty)	3300 lb.
Useful load	1980 lb.

(Including 550 lb. of fuel and oil)

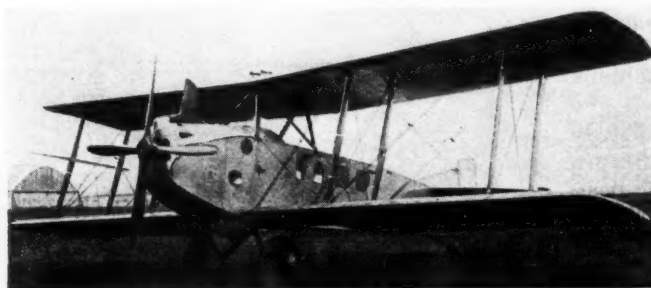
Total weight	5280 lb.
Wgt./sq. ft.	7.5 lb.
Wgt./hp.	12.5 lb.
Speed	107 m.p.h.
Endurance	5 hours

It will be noted that the propeller used is of the four-blade type and is geared down to run at about five-eighth engine speed. The cowling which covers the engine has a characteristically French appearance. Carrying the exhaust pipe

upward to about the level of the upper wing tends to muffle the noise of the exhaust and render it less annoying to the passengers. The Lamblin radiators referred to above are the torpedo shaped objects below fuselage.

Automotive Duties in Czechoslovakia

THE Parliament Czechoslovakia will shortly discuss a legislative scheme concerning the increase of import duty on automobiles and parts of automobiles. According to this bill, the import duty will be augmented, for countries to which the general tariff (autonomous) applies, by 90 per cent. of the invoice price; for countries to which a special tariff applies, 65 per cent. of the invoice price. For motor engines and motor ploughs, tractors, locomobiles, and motor boats the duty will be determined according to weight: up to 50 kilos, 6000 crowns as minimum tariff, 7500 crowns for the general tariff; from 50 to 250 kilos, 5500 crowns minimum tariff, 7000 crowns general tariff. Aeroplane engines, without distinction, will be subject to the following duties: 15,000 crowns each, minimum tariff; 20,000 crowns each, general tariff. This increase in customs duties is caused by the fact that the present tariffs do not protect home production, and bear no comparison with analogous duties levied by France, Italy, Great Britain, and the United States.



A recent design of Nieuport 5-passenger airplane

Manufacturing Possibilities Offered by Duralumin

There has been much discussion concerning the properties and uses of duralumin. This article presents a critical analysis of the manufacturing possibilities of this copper-aluminum alloy. It has been written as a result of considerable experimental and research work.

By William B. Stout*

THE new light alloy duralumin can be rolled into sheets or forged by hand, press or power hammer.

It can be cast, welded and soldered, while rivets of the same material used with it show new production possibilities, on account of the peculiarity of the heat treatment results. Connecting rods have been made of it, using the metal itself for wearing surface without anti-friction metal. These have operated successfully in both motor cars and aircraft engines. Worm gears have been made of "dural" (as it is colloquially called) and used in heavy truck service successfully against steel worms. Timing gears of this metal show new possibilities of both wear and quietness, but most use has been made of the alloy in structural shapes for ultralight constructions. The metal itself costs about five times as much as cold rolled steel per pound. For production work, however, only one-third the number of pounds is used for the same strength result, and since the material is much easier to work than steel in most of its forms, it saves materially on labor, tool cost and tool depreciation, so that in many cases constructions can be made cheaper of duralumin than of steel.

Structures are now being built of duralumin which far exceed former strength figures in wood and yet are lighter than any previous wood-and-cloth airplane constructions. We have at present in process machines capable of carrying twenty passengers at two miles a minute for five hours, and fitted with 600 hp. engines, yet the whole machine weighs no more than a Cadillac touring car. It is safe to state that the low weight figure could not have been reached with our present knowledge with any other material.

Stronger Than Steel in Structures

Many have preferred steel in their experimental aircraft work, for the reason that steel exceeds duralumin in tensile strength even after allowing for its greater weight. But the problem of strength in a structure does not always depend on the properties, but often on the column or compressive strength.

For the same weight, duralumin has about three times the thickness of even its cold-rolled boiler-plate counterpart, and five or six times the section of alloy steels of high tensile strength. The rigidity of a sheet is dependent on its thickness very largely, and, while "dural" is a much more flexible material than steel in equal sections, yet with the greatly increased sections used for equal strength a much greater rigidity is obtained than with steel.

*Digested from a paper read before the American Society for Steel Treating.

For example, we have produced a rolled section designed for a maximum column strength and yet of such shape as to fit production requirements. This section of 0.035 in. thickness of metal in a 19-in. column weighs 7½ ounces and will support a weight of over 4 tons. If made of high-tensile alloy steel, its thickness, so far as tensile requirements go, would be about 0.009 in., but this would be untrustworthy in a structure on account of the lack of rigidity of such a thin wall.

Physical Properties

Duralumin looks much like aluminum, except that it takes a high polish and that, when polished, the glinting red of the copper in the alloy can be detected. In ordinary atmosphere the polish is permanent, the metal being non-corrosive to a very high degree. In the tempered state it is almost immune to the effects of salt spray, though in the annealed form salt water affects it.

The chief difference between this and previous aluminum alloys is that its physical characteristics are materially changed by proper heat-treatment. The most peculiar thing about the metal is that the change in physical properties following heat-treatment is not instantaneous but very gradual, attaining a maximum after about four days. During this period not only is the tensile strength increased 50 per cent or more, but the elongation increases from 600 to 800 per cent. More than this, in its heat-treated form the metal can be reheated and softened for passing through mechanical processes not of too violent a nature, and at the end of one hour it will have resumed its original tempered characteristics. The fact that the extreme properties of the metal are not reached immediately, as in most metals, is of great advantage commercially, as will be explained later.

The heat-treatment or tempering of the metal consists in heating to 920-940 deg. for from 7 to 30 minutes, the time being governed by the bulk of the parts. The material is then quenched in boiling water. It is then removed from the quenching bath and worked as soon as possible. In from one to two hours' time the metal acquires sufficient hardness so that it is difficult to work.

In our airplane work we heat-treat a coil of sheet metal in a bath of sodium and potassium nitrates, quench in an adjacent tank of boiling water, uncoil the sheet or strip and start it immediately through the rolls which form it into the shape desired. The process is completed and the spar ready for aging within 20 minutes.

Duralumin is a copper-aluminum alloy, the copper content running about 4 per cent. Some magnesium is also present, and zinc is the most detrimental im-

purity. For this reason duralumin is made only from the purest 99 per cent aluminum, so that the impurities in the various elements of the alloy will not build up a detrimental quantity. It is the inability of the Germans to obtain pure aluminum which has prevented their duralumin alloy from equalling the figures obtained in every-day production from the American product.

The metal itself, however, was developed in Germany from an original French laboratory development. The first real commercial use to which it was put, so far as the public was concerned, was in the metal ships of the Zeppelin company. One of the reasons for the slow development of the Zeppelin, aside from the problems of airship design itself, was the necessity of developing the metal along with the structure.

At first considerable trouble was had with corrosion. Sheets granulated, seemingly without reason, and until the difficulties were worked out, structures built of the material were more or less unreliable and required frequent inspection. This is still true in very thin gages not carefully heat-treated, but with pieces of any real section corrosion is now an almost unheard of thing.

Troubles Due to Impurities

The main troubles with duralumin are similar to those with other alloys, being due to the presence of impurities in the ingot or to air bubbles, which later cause serious defects when the piece is forged or rolled.

Most of our material is of 0.035 in. thickness, so that a very small speck of dirt can make a serious flaw in the metal sheet and a very small air bubble a considerable pipe in the center of the sheet.

Most of these flaws do not show up until after the rolling. In this case the greatest stress on the metal in putting it through the rolls is at a hidden point, so that to inspect these spars or chord members a dental mirror is used with a high light, and the surface very carefully examined. Frequently a hole as small as the point of a fine needle can be opened up into a flaw 5 in. long—a sort of stratification of the metal—resulting from original ingot impurities.

In the design of the rolls, also, great care must be taken against too great a degree of draw between annealings, and that all radii must be sufficient for the requirements of the metal.

The great drawback of the material as we are using it at present is the presence of ingot flaws, rolled out in the sheet, which lead to a very high rejection cost. When this is cured the experimental stage of duralumin will be over. As soon as large quantities of the material are demanded rolls can be put in for greater widths of sheet than at present available—16 in. being now the best obtainable—and tubing and other structural forms will become available.

Composition: Copper, 3.50 to 4.00 per cent; magnesium, 0.20 to 0.75 per cent; manganese, 0.40 to 1.00 per cent; aluminum (99 per cent pure) balance.

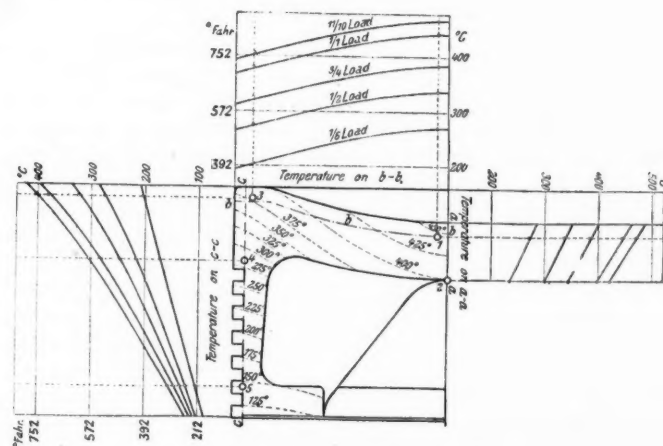
Physical properties: Specific gravity, 2.80; weight, 0.102 lb. per cubic inch; melting range centigrade, 540 to 650 deg.; compressive strength tempered, 44,000 lb.; sheet value tempered, 30,000 lb.; tensile strength tempered, 50,000 to 60,000 lb.; elongation tempered, 16 to 20 per cent; modulus of elasticity, 10,600,000; coefficient of expansion, 0.0000226 per deg. C.; yield point, 30,000 lb.

Piston Temperatures

RESULTS of an experimental investigation of the temperatures at different points of a Diesel engine piston under different loads and with different fuel injection pressures are published by Dr. Eng. W. Riehm in *Zeitschrift des Vereines Deutscher Ingenieure*. The results will undoubtedly be of some interest to automotive engineers, in so far as they show the temperature gradient through the thickness of the piston head at the center, along a radial line from the center of the piston head outward, and down the skirt. The temperatures were measured with thermo-couples set into the walls of the piston at different points. One joint of the thermo-electric couple was located at the point whose temperature was to be measured and the other joints of all couples were placed in a heat-insulated box secured to the piston head. From this box a multiple-insulated cable, made up of very fine copper wire, extended down the inside of the piston skirt and along the walking beam of the air-pump drive to the outside to a galvanometer. In this way a reliable electric connection from the moving piston to the galvanometer was obtained, which proved very serviceable and always lasted for several days before one of the fine copper wires broke. The temperature of the second joint in the heat-insulated box was measured by a special thermo-couple.

The tests were made on a 70-hp., single-cylinder, four-stroke Diesel engine of 16-in. bore and 24-in. stroke, at 165 r.p.m. Two designs of piston head were used, the object being to determine which of the two would best withstand the tendency to cracking at the center. The results obtained with one of the pistons are given in the diagram herewith. The piston-head thickness in this case is 2.085 in. and the length of that part of the piston shown is 8.4 in.

It will be seen that the maximum temperature occurs at the center of the piston head, as would be expected from theoretical considerations. When running under 10 per cent overload this temperature reaches about 900 deg. Fahr. It is rather doubtful whether such a high temperature ever occurs in an automobile engine, notwithstanding the much higher speed, because, in the first place, the temperature of combustion is higher in a Diesel engine, and, secondly, the very large size of the engine retards the flow of heat to the cylinder walls. The triple diagram clearly shows the heat gradients along an axial line through the thickness of the head, along a radial line on top of the piston head, and along the upper part of the piston skirt. The dotted lines drawn in on the piston section are isothermal lines at the temperature marked thereon.



Results of temperature tests

Headlight Regulation Discussed at Meeting of Illuminating Engineers

Education of motorists with regard to proper adjustment of headlamps one of the most important factors for improving conditions of night driving. The Massachusetts law was fully explained with examples as to the method of enforcement. City testing stations are valuable.

By P. M. Heldt

FROM discussions before the Illuminating Engineering Society, which held its fifteenth annual convention at the Powers Hotel, Rochester, last week, it appears that at present the chief problem in connection with safe and efficient headlamp illumination is the intelligent enforcement of the laws, particularly as regards the focusing of the bulbs in the reflector and the correct aiming of the lamps. Under the laws based on the I. E. S. headlamp specifications certain anti-glare devices are given approval for use in connection with bulbs of a certain candle-power, but it is realized that the use of such devices does not in itself insure efficient and safe lighting. It remains for the operator to see to it that his bulbs are properly focused, that the reflectors are maintained in a state of efficiency, that the lenses, if of the prism type, are not rotated in the headlamp shells and that the headlamps are properly aimed or directed. In some of the cities of the Middle West official headlamp adjustment stations have been established, and this seems to be the best solution of the problem. The I. E. S. system of headlamp regulation has been adopted as a standard by the S. A. E. and is undoubtedly familiar to most readers.

Wider Application of Standard Regulations

At the meeting the annual report of the Committee on Motor Vehicle Lighting was presented. In this it was stated that since the last meeting the I. E. S. system has been made the basis of headlamp regulation laws in the states of Nebraska, Iowa, Utah and Ohio, while Massachusetts had adopted the system in principle but had written somewhat different specifications for tests. The committee stated that on the basis of registration figures published in AUTOMOTIVE INDUSTRIES about 43 per cent of all the cars in use in the country were now operating under laws based on the I. E. S. system, as compared with 25 per cent last year. The Province of Ontario also had adopted the system, and 42.5 per cent of the total registration in the Dominion of Canada were thus operating under the I. E. S. system.

It had been suggested to the American Engineering Standards Committee that the I. E. S. specifications be adopted as a tentative American standard, and this matter is now pending. It was learned that the International Commission on Illumination had adopted a resolution to the effect that headlamp regulations should be framed on the basis of an international agreement, so that the regulations would be uniform for all countries. The Commission established a study committee on the subject of automobile headlights, which is to report at the next session of the Commission. This study committee, of

which Dr. C. H. Sharp of the I. E. S. is president, is to draft technical proposals suitable for international adoption and to use the influence of the International Commission to convince the authorities of the different countries of the importance of uniform regulations throughout the world.

Proposed Change in Tests

During the past year most of the work of the I. E. S. Motor Vehicle Lighting Committee had been in connection with details, but one definite change in procedure in connection with the tests of lenses was proposed. Up to the present two pairs of a certain size of lens had been tested with both 15 cp. vacuum and 21 cp. gas-filled lamps. It was proposed that in future the tests should be made with gas-filled lamps only, but that one pair of each of the four sizes of lenses standardized by the S. A. E.—namely, 8 5/32, 8 1/2, 9 and 9 1/2 in.—be tested. The object of the change was to make the results of the tests more representative of the device, since different molds were used for the various sizes.

The report concluded by stating that conditions on the road in night driving were becoming notably better. Complaints of excessive glare were still being received, however, and sometimes the complaint had been made that the work of the committee was futile, because it had not resulted in a more radical improvement. The committee submitted, however, that such criticism was not necessarily just, as its work extended only to a certain point. Lamps accurately focused or aimed might, even with the best of devices, produce an intolerable glare or an abominably low illumination, or both, and it was evident that the results on the road were to a great extent dependent upon the education of the motorist with respect to the proper adjustment of his headlamps and on the officers of the law to whom the enforcement of head-lighting regulations was intrusted.

Among items for future consideration by the committee are the determination of a standard for the illumination of rear license plates and the illumination of stop and turn signals. It was stated that there is a real need for an authoritative booklet on the proper adjustment of headlamps and on simple methods of checking the illumination to see if it conformed to the specifications.

New Massachusetts Regulations

A. W. Devine of the Massachusetts Department of Public Works read a paper on Motor Vehicle Headlighting in Massachusetts. He said that in that State the much-copied regulations of Oct. 27, 1915, remained

in force until Aug. 15, 1921. These called for sufficient light directly ahead of the vehicle to make objects 150 ft. ahead clearly visible; for the absence of dazzling rays 3.5 ft. or more above the ground, 50 ft. or more ahead of the vehicle, and for sufficient side illumination so that any object 10 ft. to the side and 10 ft. ahead of the vehicle could be distinguished.

Hundreds of motorists were prosecuted under this law and substantial fines were imposed. The method of enforcement was as follows:

The officer would select a point on a straight, level, unlighted roadway from which approaching vehicles were visible for a distance of an eighth of a mile in both directions. From this point he would measure off 50 ft. in both directions, and would observe the light from approaching vehicles from the time they came into view until they were within 50 ft. of him, in the meantime walking back and forth across the road so as to observe the approaching light more carefully. To avoid the possibility of mistakes only vehicles with specially glaring headlamps were stopped. Operators of machines on which no attempt had been made to regulate the light were summoned into court for violation of the regulations, and in practically every case were fined.

Such enforcement was often preceded by educational work. On certain nights in different parts of the State motorists were invited to congregate at certain points and have their lighting equipment examined by a competent inspector who pointed out defects and faulty adjustment and advised regarding methods of correcting the defects.

As time went on it became apparent that the regulations were not very effective any more. All kinds of glare-eliminating devices were used, some very inefficient, and the lower courts would accept the statement of police officers only if no evidence was introduced to show that an attempt had been made to reduce the glare. The Highway Commission realized that it was not merely a question of the device used, but almost wholly a question of the adjustment. Therefore, on Dec. 1, 1919, when the Highway Commission was absorbed by the larger Department of Public Works and a Registrar of Motor Vehicles took over all the powers of the Highway Commission having to do with motor vehicles, it was decided that something should be done to correct the lighting situation.

Frank A. Goodwin was appointed Registrar of Motor Vehicles, and he detailed Mr. Devine to make a thorough study of the head-lighting problem. The latter first made laboratory tests on the light distribution obtained with some thirty non-glare devices, using a pair of accurate paraboloidal reflectors of 1 3/8-in. focal length, bulbs of 21 mean spherical cp. and 9 and 9 1/4-in. lenses. Following this, road tests were made over a period of several months, the lamps under test being mounted on universal brackets so that aiming tests could be made, and another pair of headlamps mounted beside them for the sake of comparison.

Road Lighting Requirements

As a result of these tests and the experience of the investigation department, it was determined that a minimum spread of beam sufficient to cover a 12-ft. roadway would be required for the safety of the users of the

highway. It was also determined that the I. E. S. specifications for glare limits were reasonable, and no attempt was made to modify them. These limits are: 2400 cp. max. at a point 100 ft. ahead of the car, 5 ft. above the ground, and 800 cp. max. at a point 7 ft. to the left of that point.

The next step was to determine what intensities should be required in different parts of the beam. The I. E. S. specification for road performance required a normal illumination of 0.12 foot-candles at the A or B and E or F points. This value was found to be a low minimum in actual road tests, particularly so in the case of a number of devices with which it was almost impossible to see an object illuminated to a corresponding brightness because they projected a beam of rapidly varying intensities from one point to a nearby point. In view of the fact that the Headlight Committee had established such a low and unusually fair minimum, it was felt that it would not be acceptable in making laboratory tests. Road tests and laboratory tests compared showed that under fair conditions of actual use the depreciation in lighting equipment would cause a reduction in illumination of about 50 per cent, as a result of a decrease in the reflection coefficient of the

reflector, a decrease in the impressed voltage on the lamps and deterioration of the lamp bulbs. For this reason it was decided that, as far as the laboratory tests were concerned, the requirements of the I. E. S. specifications for road performance should be doubled and an illumination of 0.25 foot-candles be called for at such points as it was decided to make tests.

In the application of these regulations headlamps are ordinarily mounted at a height varying from 34 to 38 in. above the ground, but for purposes of laboratory test the lamps were assumed to be at a height of 42 in. above the ground. This assumption results in greater freedom from glare in practice, but if not corrected for in computing the required minimum intensities in the beam would mean that those devices which complied with the specifications would not necessarily have sufficient spread to cover a 12-ft. roadway as desired. For this reason those minimum laboratory test points were selected which, with the centers of the lamps at an assumed height of 42 in. would indicate the parts of the beam which strike the edges of a 15-ft. flat roadway, or, under average actual conditions, would indicate the parts of the beam which strike the edges of a 12-ft. roadway. The P and Q points are those points in the beam which strike the edges of a 12-ft. roadway 115 ft. and 57 ft. respectively ahead of the car when the lamps are 36 in. above the ground. The M point is the test point at which is measured the intensity directly ahead of the car 1.25 deg. below the horizontal. This point is 0.25 deg. lower than the society's B point. Retention of the B point would have required 10,000 cp. and would have caused several satisfactory devices to fail to comply with the specifications. Furthermore, it might have resulted in the design of devices with too sharp a cut-off or which approached the glare limits at C and D too closely, resulting in excessive glare when the molds in which the lenses are made had worn slightly. It was felt that illumination up to a distance of 200 ft. ahead was not necessary for safe driving at a reasonable speed. The new regulations were drawn to call for

A RADICAL change for the better in night driving conditions cannot be effected until police officers charged with enforcement of the law and the car drivers are educated as to proper methods of lighting. In Massachusetts enforcement campaigns were often preceded by meetings of motorists where lighting systems were examined and experts explained methods of correcting the defects.

illumination up to a distance of 160 ft., an increase of 10 ft. over the old regulations. The wording of the specifications for laboratory test was taken from the society's specifications with a few changes. These specifications were given in part in Mr. Devine's paper.

Method of Enforcement

Considerable thought was given to the method of enforcement to be employed before formulating regulations. The use of a portable photometer in testing the road performance of lighting equipment was not considered entirely practical, and it was finally decided that the use of double specifications (road and laboratory) was undesirable. To secure compliance with the law it would be necessary to educate the public to make proper adjustments under any system, and adding the use of a photometer only complicated the problem.

The alternative method then suggested itself that enforcement could be had on the basis of condition and adjustment of equipment. A bill was introduced and adopted that "No headlamp shall be used upon any motor vehicle * * * unless such lamp is equipped with a lens or other device approved by the registrar, designed to prevent glaring rays." Regulations were drawn up requiring that headlamps be used on insufficiently lighted ways, that every approved device be applied and adjusted as required by the registrar's approval, that light sources of 21 cp. only be used and that any reflectors used as a part of such headlamps should have highly polished silvered or glass reflecting surfaces. These regulations went into effect on Aug. 15, 1921.

Other states have limited the maximum candle-power which can be used, and in Massachusetts it was felt that it was necessary to set a minimum candle-power as well, in order that the motorist might not be troubled so much by insufficient illumination. By standardizing on one size of light source, the contrast in the illuminated fields ahead of two vehicles is reduced to a minimum and, besides, there are advantages in the elimination of the many sizes of electric bulbs which dealers have heretofore stocked. In interpreting this provision, if a bulb of 21 rated cp. were used, a reasonable variation in candle-power above or below this figure would not be a violation of the regulations. In addition to the requirement that only 21-cp. light sources be used, all approvals of electric headlamp devices which have so far been issued require the use of a type C (gas-filled) bulb. This requirement is made not only to further standardize on equipment, but also on account of the higher efficiency and slower depreciation of the type C bulb. The new law in Massachusetts calls, then, for the use of an improved device, 21-cp. type C bulb (in electrical equipment), highly polished reflectors and proper adjustment of the device.

Tests of Lighting Devices

Forty-three applications for approval of electric headlighting devices were received and tested up to Aug. 15, 1921. Of these, 26 devices were approved for use; of the devices which were not approved 14 failed to comply with the limiting test intensities and 3 devices were refused approval, although they complied with the limiting intensities. Two of the devices which were

refused approval were deemed to be unsafe for use on account of unduly dark and bright areas within the area outlined by specific points, and one was refused approval because of unduly difficult and complicated adjustment.

The results of the tests of devices for approval clearly show that the requirements are much more severe in Massachusetts than in states which have adopted the society's specifications. Much importance is attached to sections reserving the right to refuse approval of any device which, although it conforms to the specified limiting intensities, is liable to prove unsafe because it does not comply with the intent of the specifications or unsatisfactory because it has an unduly complicated adjustment.

Focusing Device for Private Owners

Education of the motorist to the necessity of making proper adjustment of his headlamps and keeping his lighting equipment in good order is of prime importance. A novel method of educating the public is being used. A circular disc of heavy paper, perforated with two 0.25-in. holes, spaced 4 in. apart and equally distant

from the center on the same diameter is being issued. On this disc is printed the requirements of the law, the approved list, and focusing and aiming instructions. The disc is used for focusing the lamps by holding it in front of the lamp being focused without the device in place. Two filament images are projected on a vertical surface 25 ft. from the lamp, one image from the top part and one from the bottom of the reflector. The relative position of these images, one to

EXPERIENCE has shown that glaring and blinding headlights usually result from improper focusing. Motorists who have neither the inclination nor ability to adjust their lamps would be benefited if stations were installed in their home city, where experts could periodically examine their lighting equipment and adjust it to conform with required standards. This method has been successfully used in several cities. Some of the devices that have been used are described in this article.

the other, determines the focal adjustment. This focusing disc has met with great popularity, so much so that some difficulty has been experienced in supplying the demand.

Another important consideration is that for persons who have not the inclination or ability to adjust their own lamps, some place should be available where they can go to have the lamps adjusted. For this purpose complete printed instructions are being issued and competent persons who have the proper facilities are being approved of. Eleven trained inspectors from the Registry of Motor Vehicles are traveling throughout the State instructing and examining mechanics and others who seek official certification of their competency.

Tests on Illumination Requirements

Another paper was presented by H. H. Madgsick and R. N. Falge of Nela Park, Cleveland, and dealt with "A Determination by Various Drivers of the Desired Road Illumination from Automobile Headlights." Data were presented showing the road illumination from headlight equipment as set in a moving car by a total of 13 observers, under various conditions of road surface, contour, boundaries, street lighting, weather, speeds, etc., with lighting facilities which afforded a considerable range of intensity and distribution. These data indicate in a general way the lighting required for safety and a moderate degree of convenience—that is, the lower limit of what might be termed good practice—for the more common road conditions. They are not sufficiently complete to permit an analysis of the effect

of each of the variable factors. A description was given of the equipment employed, together with an outline of the procedure followed in obtaining the data.

The authors stated that in considering data of this kind from the standpoint of lighting equipment for a car it must be borne in mind that, because of conditions beyond the control of the car owner, such as large variations in voltage at the lamp, departure from a perfect product in sockets, incandescent lamps, reflectors and cover glasses, and depreciation in some of these elements, the laboratory tests with selected equipment must in general show twice the intensity values which it is desired to insure that the car owner obtain at all times in service.

The data presented were, as already pointed out, what the observers considered the minimum desirable from the standpoints of safety and reasonable convenience in driving under the given conditions. A higher order of intensity was in every case considered to reduce the strain of night driving and to contribute to the safety and enjoyment of the driver and his passengers, while also minimizing the danger to other people on the road.

The discussion centered largely around the enforcement of headlamp laws. It was opened by John A. Hoeveler of Madison, Wis., who said that we are not getting the enforcement we should have. The police cannot handle photometers and the motorist is suspicious if such a device is being used on him. Therefore, testing stations are necessary. In Milwaukee such a station has been in operation for several months. At this station a testing board is rigged up on which there are four translucent bulls-eyes. The two upper ones are for the determination of the non-glare qualities of the lamps and the two lower ones for the determination of the road illumination power. These bulls-eyes are lighted up from behind, and two of them must show light and the other two dark in order that the lighting equipment may comply with the State regulations. The outfit is operated by two police officers, one of whom spots the cars and the other operates the photometric equipment. The whole installation was worked out by the illuminating engineer of the city of Milwaukee, and it was perhaps fortunate that the city had such an engineer, which insured that the arrangement and method of use were accurate and practical. The station will shortly be closed for the winter, but in the future may be operated throughout the year.

Motor vehicle officers send into the station vehicles that seem to produce an inordinate amount of glare. Service stations are being appointed throughout the city for making adjustments of the lighting equipment. A plan of this kind could be worked out in each community, stations being established, for instance, at the county seats, and there would be no difficulty at all in establishing such stations in the larger cities.

Developments in Ohio

Dr. Francis C. Caldwell of Columbus, Ohio, said that the lighting situation was particularly acute in the State of Ohio. There they looked upon Massachusetts as a pioneer in the regulation of headlamp illumination. Conditions in Ohio were probably more representative of those throughout the country than conditions in Massachusetts. A new law went into effect in Ohio on Aug. 15. It called (1) for a distribution of light adequate to properly show obstacles in the road 200 ft. ahead of the vehicle; (2) for tests and approval of glare-controlling devices by the Director of Highways, and (3) for the reduction of glare below a certain maximum. There

were no provisions for the enforcement of the law other than the regular police powers of the State. Until recently the control of motor traffic had been in the hands of the Director of Highways. This official has to look after a great deal of highway construction and, as a consequence, is over-burdened with work, which causes him to look upon the control of motor vehicle traffic more or less as a nuisance.

All tests are made with 21-cp. lamps at the Engineering Experiment Station, a State institution. The great problem in Ohio, as elsewhere, was to get people to adjust their glare-control devices properly, and this called for the establishment of test stations. In Ohio no State funds were available for the purpose, but people with commercial interests in lighting equipment were taking the matter up. In Cincinnati and Cleveland these people have induced the automobile clubs to get together with the police and provide the necessary testing stations.

Tilting Headlights

There was a strong demand for more light than allowed by the I. E. S. specifications. A tilting headlight would be approved regardless of what illumination it produced when in the non-tilted position. For this the driver was allowed to take the responsibility. One glare-control device was turned down because it gave a very unsymmetrical distribution, with the result that pedestrians on the sidewalk at the right-hand side would get much more than 800 cp.

One of the speakers taking part in the discussion stated that on a certain make of low-priced car on which the bulb is adjusted from the rear by means of a screw and the reflector is held in place by a spring, when the non-glare device is applied to the lamp the position of the reflector relative to the bulb is materially changed, which has a great effect upon the lighting efficiency of the lamp.

Dr. Louis Bell said that he was interested in Mr. Madgick's paper and the indications it gave that greater illuminating power was required at high speeds. We could not expect pedestrians to wear a red tail-light like the British Tommies were compelled to wear just before the war when marching in column formation.

Mr. Davidson made the assertion that focusing stations were needed. In his locality it was the practice of the police to give motorists whose headlamps showed an inordinate amount of glare 10-day cards which instructed them to go to an adjusting station and have their lights properly adjusted and then come back and report to the police. If they did not come back within the specified time, the police would go out and get them.

Frederick H. Ford of Waupun, Wis., said that, as a lens maker, he would suggest the provision of focusing stations in small towns, located in vacant lots abutting a street. They should be so arranged that car owners could drive there at any time and see for themselves whether their lamps were properly focused.

One speaker pointed out that in some of the cheaper cars, which had headlamp shells of very flimsy material, the lenses were inadequately held and sometimes turned around their axis, which nullified all the good work that the society had been doing. Lawrence C. Porter of Harrison, N. J., stated that the Ford company had recently made a move that was greatly to be commended. In his State the agencies were required to paint on the garage a white rectangle and all cars sold by them had their lamps adjusted so that when the car was spotted at a certain distance from the wall and pointed in the direction of the rectangle the entire beam from the lamps came within the rectangle.

New Gear Grinder Works on the Generating Principle

Machine includes self contained drive and a 30 inch wheel with plane grinding surface. Handy location of control levers is feature. Three important conditions fulfilled to insure perfect involute generation. Work spindle rotates through a sleeve to which the power is applied.

IN the grinding of gears after hardening three different requirements have to be met: (1) The face of the tooth must be ground smooth; (2) the face must be ground to true involute form, and (3) the machine must index accurately so that the teeth will be properly spaced.

A gear grinder designed to meet these requirements has been brought out by the Lees-Bradner Co., and a photographic view of it is shown herewith. With this machine it is possible to grind spur gears with involute teeth of from $14\frac{1}{2}$ to 24 deg. pressure angle, from 12 to 3 diametral pitch and from 2 to 12 in. pitch diameter. A grinding wheel of 30 in. diameter with a plane grinding surface is used. The wheel is supported on a stationary column and the work is traversed past the wheel by a slide having a reciprocating action. The work is given a rotary together with a correct sliding motion, in order to obtain the desired profile. To obtain this combined sliding and rolling action a segment corresponding to the pitch diameter of the gear to be ground is used, in conjunction with tapes or bands.

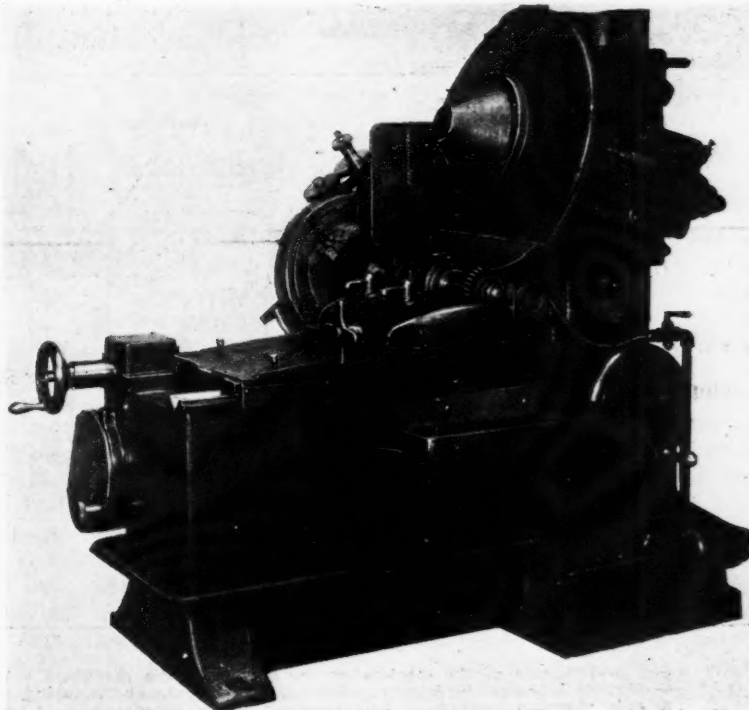
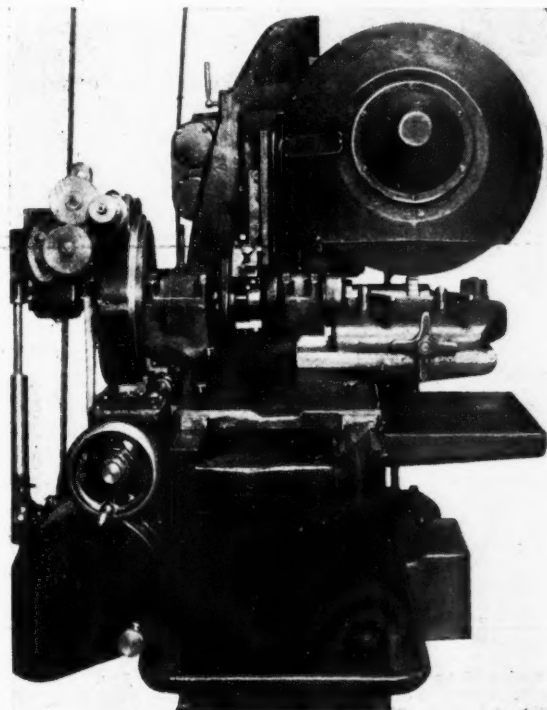
A diamond is used to true the face of the wheel. It is both lever and screw-controlled, and, of course, travels in a straight line to keep the plane face of the wheel true; it is used in conjunction with the wheel spindle micrometer feed.

The drive to the wheel is by an endless belt, self-contained on the machine. This belt is guided by two idler pulleys which are carried in a bracket, with sliding adjustment on the back of the column, to suit any diameter of gear being ground. A single belt is used to drive the machine from a line shaft, but a motor drive may be substituted.

Indexing is by means of hardened and ground plates, secured to the work spindle and completely shielded inside a case. The indexing is automatic and takes place at one end of the slide reciprocation. Setting the wheel at the proper angle is accomplished by means of a worm and segment on the swivel head. A pump circulates the coolant. The work can be held between centers, or supported on a mandrel having a taper shank to fit the spindle and supported at the outer end by the tailstock

Meets Generating Conditions

To grind an involute tooth profile correctly with the above type of machine, it is necessary that the gear blank and grinding wheel have perfect coaxing motion of generation. Such accurate generating motion is hard to obtain. Three important conditions must be fulfilled in order that a perfect involute may be generated: First, there must be uniform motion between the tool and blank;



Figs. 1 and 2—End and side view of Lees-Bradner No. 10 gear tooth grinder

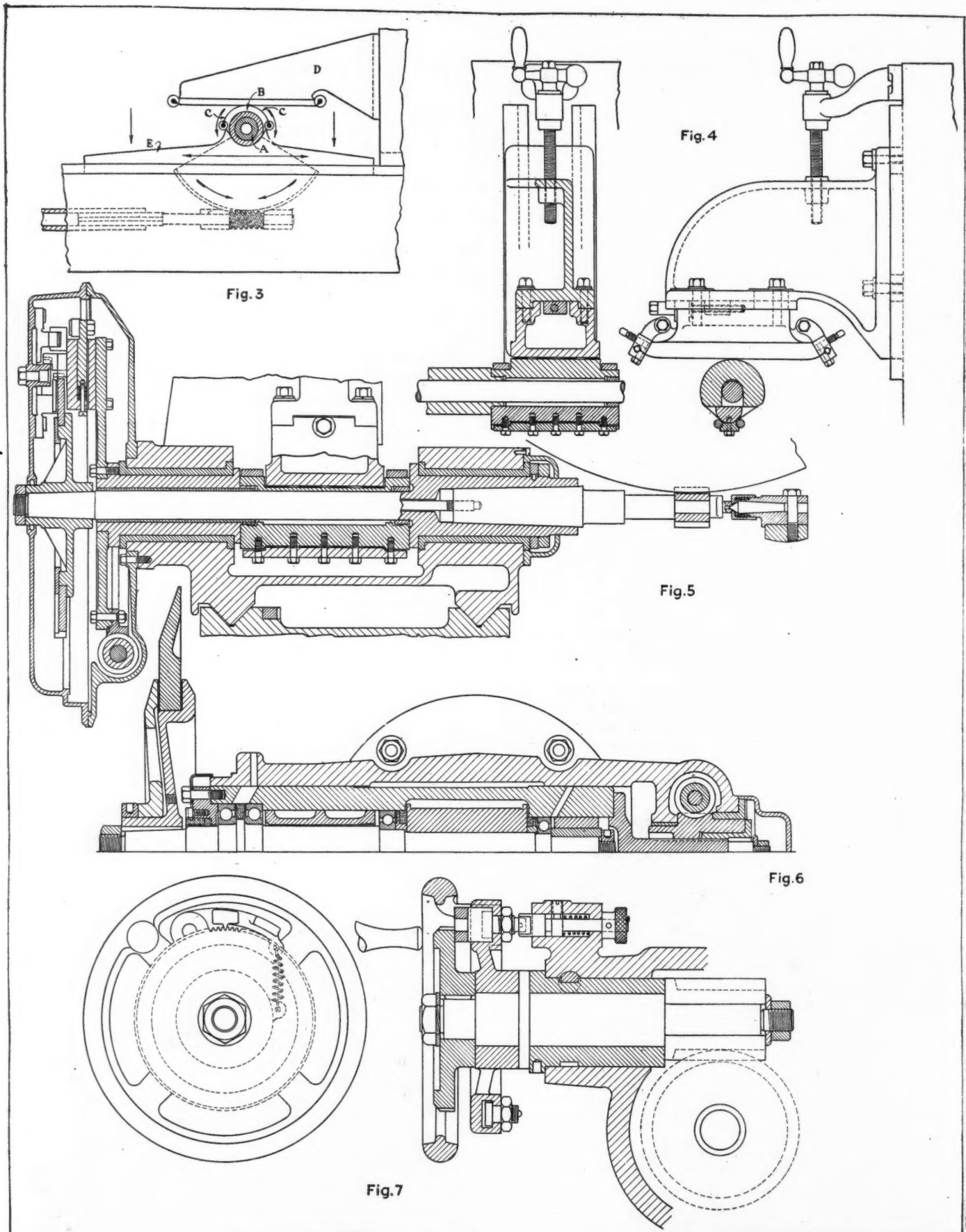


Fig. 3—Diagram of the mechanism for producing the combined rotary and sliding motion for gear generation. Fig. 4—Method of mounting bracket adjustably on column and securing tapes to tape bar. Fig. 5—Section through work spindle showing method of driving work arbor, construction of tailstock and work mounted on arbor (gear pinion). Fig. 6—Section through grinding wheel spindle. Note the driving pulley in the center, the method of mounting the wheel on left, and worm and wheel micrometer adjustment for grinding wheel at right. Fig. 7—Micrometer adjustment for grinding wheel, used in dressing wheel and for setting for rough and finish cut

second, centering the tool and blank must be eliminated, and, third, there must be continuity of action between the tool and the gear tooth profile. A disk or segment and a tape are probably the most accurate method of obtaining a correct rotating and sliding connection. The use of tapes and segments is old, but in the past the power has been applied to the work slide as reciprocating action, and this reciprocating action converted into rotary motion of the work spindle by the tapes. In this gear grinder the power is applied to a sleeve through which the work spindle rotates when indexing. When the machine is grinding, the sleeve and work spindle rotate together as one unit.

The sleeve *A* (Fig. 3) carries the segment *B* to which one end of each of the tapes *C C* is fastened. The other ends are fastened to a bracket *D* on the column; accordingly, when the sleeve is rotated first in one direction and then in the other, the tapes will wind on and unwind from the segment, and thus through their pulling action on the bracket cause the work slide *E* to reciprocate. It is apparent from the diagram that there is a uniform torque load to the work spindle by a worm and wheel whose primary function is to rotate the sleeve in reversed directions; also, that there is uniform load on the tapes due to the fact that the frictional resistance of the work slide on the ways is maintained constant by gravity only.

Plane Surface Grinding Wheel

The problem of centering the tool and blank is done away with by the fact that a grinding wheel with a plane surface is used when generating. The tapes are anchored to the tape bar which carries the four tapes, two from each end. The bracket is supported and adjusted on the column for different pitch diameters of gears to be ground. These tapes are known as butcher saw steel, and are made of the finest Swedish stock $1\frac{1}{4}$ in. wide by .025 in. thick. They are all of the same length and are placed in position loosely both on the tape bar and segment, and at the time of tightening up there is an independent end adjustment of the tape bar which is used to move the tapes endwise and in this way turn the segment from its vertical position for the original set-up. To find this position there is a zero mark on the bearing and the sleeve.

The drive for the wheel is from the pulley at the base, then over idlers in the sliding bracket to the grinding wheel spindle and up the stationary pulley at the top of the column. The main pulley shaft drives the gearing in the reverse feed box shown at the right hand end of machine. Speed change gears are used for the number of strokes per minute required of the work slide. The length of travel of the slide is regulated by a trip dog located inside the small circular door at the top of the gear case.

The starting and stopping lever for slide travel is shown at the right hand end of the work slide. This is also operated from the front of the machine. The wheel spindle is mounted on a combination of ball and bronze plain bearings to steady the action with oil films. End thrust is taken by a raised shoulder on the spindle close to the wheel, which shoulder is interposed between two ball bearings, and these are adjusted by the cap screws on the outer side of the flanged end cap.

The diamond of the wheel dresser is mounted in a ball socket container which can be swivelled to any angle, thereby using the diamond face on all its edges. This container is locked in the arm which can be fed either by worm and wheel or by hand, so that either a fast spiral cut, or a slow continuous cut, may be taken on the wheel face. This dresser is carried by the main swivel head

casting, locating the diamond point always in one plane, which is the generating plane, and the adjustment is made endwise of the wheel to the diamond when taking a dressing cut.

Changes Over Old Model

The machine here illustrated embodies a number of changes over the original design, including the self contained drive, a 30 in. instead of a 24 in. wheel, the use of four tapes in place of two, and a relocation of control levers for greater handiness.

The operation of the machine is as follows: A segment equal to the pitch diameter of the gear to be ground is located on the work spindle. The grinding wheel is set at the pressure angle of the tooth to be ground. The head carrying the wheel is raised to the correct height so that the wheel will cover the working depth of the tooth. The wheel is dressed with the aid of the micrometer adjustment, and is then moved to the starting position by the micrometer handwheel. There are two positive stop pins located in a circular T slot and these are used in conjunction with a positive stop to locate the wheel in a start and finish position. There is also an intermediate spring stop for the roughing cut. The starting stop is usually set to grind 0.004 in. from the tooth.

The gear to be ground is then locked on the work arbor with a tooth in contact with the grinding wheel face. The machine is started up and the roughing cut is taken, located by the spring stop, usually cutting 0.003 in. from the teeth once around. Then the micrometer is fed up 0.001 in. more to the finish stop, thus making up the 0.004 in. allowed for grinding. This brings the wheel back again into the generating plane and the same position in which it was dressed. When the wheel needs to be dressed again, which is usually every other gear, 0.004 in. is taken off the face. This is accomplished by an independent feed to the micrometer so that the stops for starting and finishing do not have to be disturbed.

This consists of a notched disk and a lever pawl. Releasing this pawl allows the wheel to be fed up 0.002 in. for each notch, so that usually two notches are used to bring the wheel against the diamond the average cut of 0.004 in.

The indexing of a gear is a very important factor in obtaining quiet running gears. The index plates are hardened and ground and are made from masters made by the Warner & Swasey Co. They are said to be very accurate.

Running Loads for Anti-Friction Bearings

TESTS bearing on the maximum running loads of ball and roller bearings have been conducted at the National Physical Laboratory recently. The machine on which they were made was kept running at 1300-1500 r.p.m. It seems that at this speed the ball bearings made by a well-known manufacturer will not fail until the shaft which it supports is dangerously loaded. It has not been found possible so far to damage a roller bearing to any serious extent. The tests show that ball and roller bearings properly mounted and protected from moisture or dirt are efficient under high loads, and it is possible that the ordinary running loads adopted are smaller than necessary. One interesting observation that has been made upon several different makes of both ball and roller bearings is that a few hours' running at the nominal maximum loading reduced the friction observed on subsequent running at lower loads. This reduction amounts to 10 or 15 per cent. Whether this is always the case or not we have not sufficient evidence at present.

The Production of Pressed Steel Wheels Is Successfully Accomplished

This article describes the various operations required in fabricating one type of disk wheel. By proper heat treatment and knowledge of possibilities satisfactory results are being obtained. Great care required to prevent internal strains being set up in the metal.

By J. Edward Schipper

THE constantly increasing use of pressed steel for automotive parts has resulted in some notable achievements in die work and in the use of this material. It would probably not be going too far to say that this is one of the most marked tendencies in automotive design, not only for automobiles, but for trucks and tractors as well. Recent achievements in the cold drawing of metal have far exceeded things that men who are old in the business believed possible. By the correct designing of dies and the proper selection and treating of the materials, some extraordinary results are being obtained.

The problem of using pressed steel for structural parts is not as simple as would appear on the surface. Great care must be used to avoid internal strains in the metal, thus making it impractical or even dangerous to use the finished products. By proper heat treating, however, and by an exact knowledge of what can and cannot be done in drawing the material, results are now being obtained which are satisfactory to many who have been very cautious about using this material heretofore for certain highly stressed parts.

The Gier pressed steel wheel, which is manufactured by the Motor Wheel Corp., offers a good illustration of the use of a pressed steel part in making a highly essential unit of automotive construction. This wheel, which is now being manufactured in quantity, is stamped out from $\frac{1}{8}$ -in. steel sheet. By proper sectioning of the wheel, sufficient lateral strength has been obtained and an increase in resilience has been secured. This particular wheel has some special features which are of interest. It is so manufactured and designed that it can replace the wood wheel without changing the hub. It has been made interchangeable with the wood wheel by using the wood wheel hub without change and by employing aluminum spacer pieces so that the same width hub is secured and the same bearing mountings employed. In replacing the wood wheel with this stamped wheel, it is therefore possible to simply

remove the wood wheel and to slip the Tuarc wheel on in its place.

Another feature is the forming of the wheel in such a way that the same type of demountable rim employed on the wood wheel can be used on the steel wheel. Thus the installation is brought about with a demountable rim instead of a demountable wheel. It is claimed that this results in a reduction of total weight and an increase in convenience in tire changing since it is not necessary to lift the entire steel wheel.

Another feature of interest in the wheel is that a particular dish shape, employed for lateral stiffness, also permits the valve stem to pass through the dish, giving an accessible valve.

To incorporate these features in a stamped wheel and at the same time to secure the proper stiffness and strength gives a manufacturing problem of particular interest at this time when a very close study is being made of the possibility of pressed steel parts.

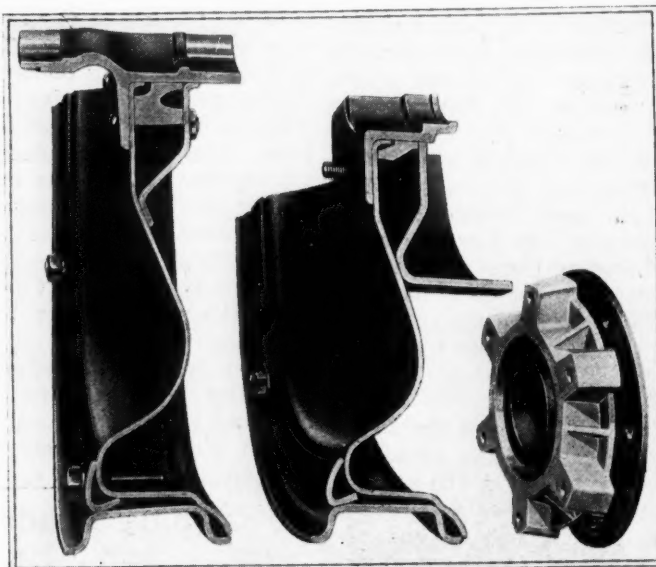
The main operation, that of drawing the disk is divided into three parts. The steel stock is, of course, provided in sheet form. The first operations are to secure the circular blanks. The steel sheets are pickled and sheared into squares and a

center hole for location is drilled. Locating from this hole, the circular blank is cut by means of a rotary shear, leaving an excess of material in the periphery to take care of the drawing operation.

Making Operations Simple

The first drawing operation on the blank disk is performed on a No. 268 $\frac{1}{4}$ Toledo toggle press with a capacity of 410 tons. The operation, which is shown in Fig. 1, partially forms the disk. In this illustration the circular blank and the form of the disk after the first pressing operation are shown.

The same press equipment is used for the second drawing operation on the disk. This increases the depth of the draw and puts the disk into condition for its final



Sectional view through Tuarc wheel showing construction. The hub is a forging, the spacer an aluminum casting and the other main parts are steel stampings



Fig. 1—For this operation on a blank disk a 268 $\frac{1}{4}$ Toledo toggle press with a capacity of 410 tons is used. Fig. 2—The same press equipment is used for this operation as in the first. Fig. 3—Forming and flattening disk. For this operation a No. 80 $\frac{1}{2}$ Bliss press is used. The capacity of this press is 1091 tons. In this operation the disk is given its final shape, after which it is ready for center draw, punching for rim bolts, air valve stem hole and driving lugs. Fig. 4—When piercing rim bolts in the disk the bolt is extended through the felloe band and is held in place by demountable clips. The design on the bolt is such that when the nut is tightened on the clamping ring the bolt is drawn in place and forms a component part of the felloe band itself

forming, which is done in the third operation shown in Fig. 3. This finish forms and flattens the disk. For this operation a No. 80 $\frac{1}{2}$ Bliss press is used. The capacity of this press is 1091 tons. In this operation the disk is given its final shape, after which it is ready for the machining operation. The heavy press not only puts the final form on the dish in the wheel, but also is a truing operation to bring the wheel to the proper flatness.

After the final pressing operation on the disk, the center opening through the wheel is punched and drawn. The original small center hole which was used for locating the trimming of the circular blank is used to center the punched hole. The operations on the wheel after this center hole is punched and the center draw has been made, are simple machining operations which do not offer any complications. The flash is trimmed off the wheel in a

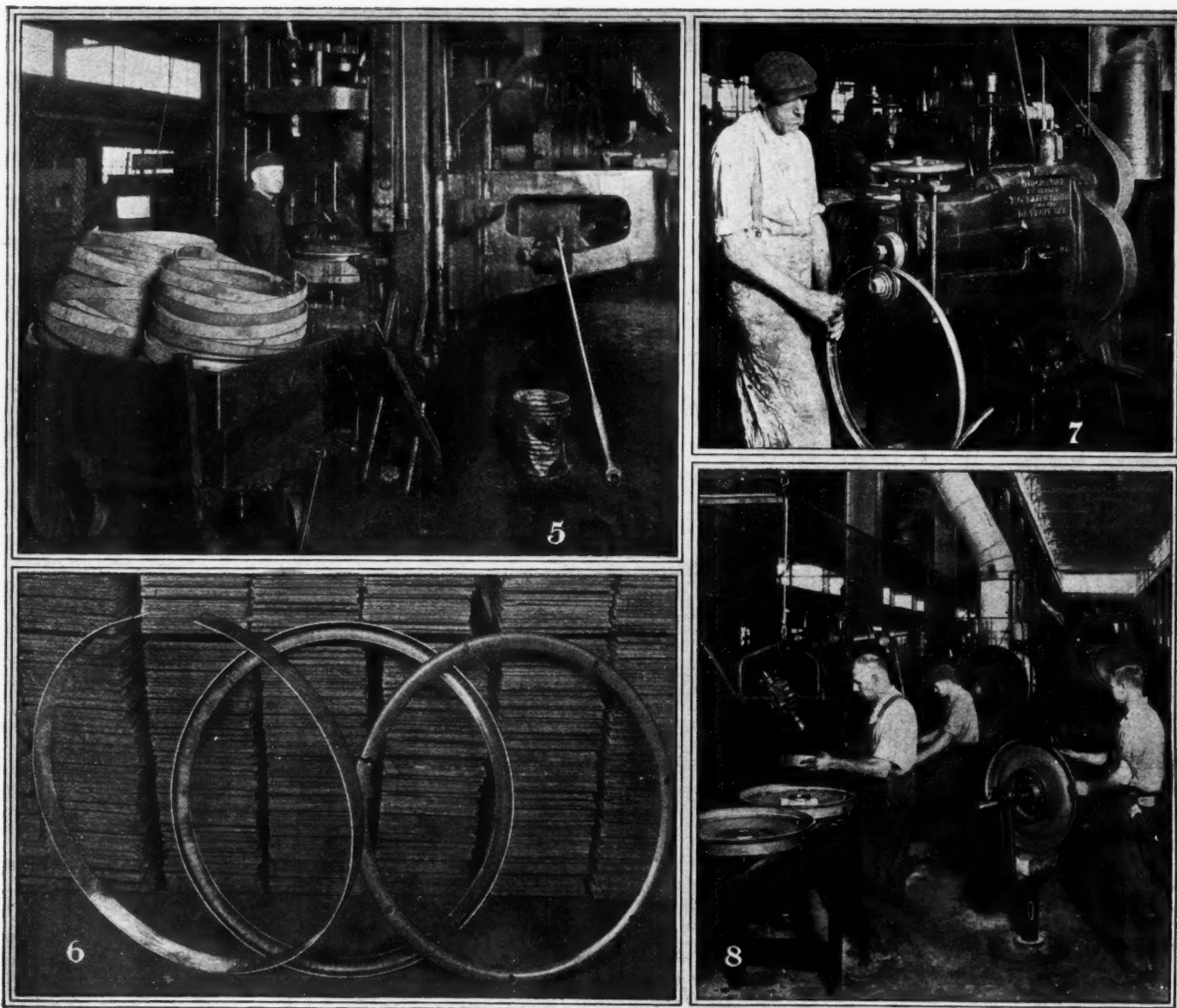


Fig. 5—For the first operation on clamping ring a 78½ Bliss press with a capacity of 453 tons is used. The blank for this operation is a plain hoop of steel. Fig. 6—Clamping ring in three stages. The one on the left is the ring blank; in the center it is shown after the first forming operation, and at the right after the final operation and piercing for rim bolts. Fig. 7—A truing operation on a 10-in. Collier-Smith beader. This brings the clamping ring to its final form and brings the ends together. Fig. 8—Assembling, inspection and paint booth. After assembly, the wheels are tested accurately for trueness; after which they pass to the painting booth. Note the compressed air nut tightener and the bolt clipping machine at the assembly bench

rotary trimming machine and the rim bolt holes are pierced. In some of the wheels for certain types of rims, it is necessary to depress the rim bolt holes and this operation is taken care of on the special machine illustrated in Fig. 4.

The rim bolt is extended through the felloe band and held in place by a demountable clip. The design of the bolt is such that when the nut is tightened on the clamping ring, the bolt is drawn in place and forms a component part of the felloe band itself. The machine shown herewith is a simple toggle punch, the same machine being used for depressing where necessary and for punching the rectangular rim bolt holes. There is also a driving lug hole, valve stem hole and side valve stem hole, all of which are pierced in the disk before it is ready for assembly. The drawing for the hub, which is known as the center draw, and the piercing of the hub bolt holes, are done in one operation.

Compared with the disk, the hub flange operation is simple. The hub flange is formed and pierced in one operation. The operations on the clamping rings, how-

ever, are a little more complex. This ring is also made from sheet steel stock which is first pickled, then sheared into strips and formed into hoop shapes. The hoop-shaped blanks are passed to a No. 78½ Bliss press, having a capacity of 453 tons. This performs the first forming operation on the steel hoop. A second forming operation is performed in the same press, which is illustrated in Fig. 5.

The various phases of the clamping ring are shown in Fig. 6. In the background of this illustration are the steel sheets which are the raw material for the work. The hoop to the left is the result of the first rolling operation after the sheets have been cut in strips. In the center is the ring as it appears when flanged over in the first stamping operation and to the right is the finished clamping ring which has been formed, then bored, pierced and washed to make it ready for assembly.

The ring does not leave the second drawing operation in exactly its final form, as there is a truing operation on a 10-in. Collier-Smith beader illustrated in Fig. 7 which brings the clamping ring to its exact final form and

brings the ends together so as to provide the correct roundness.

The spacing piece which is used between the inner and outer hub flange plate is an aluminum casting which is drilled in a Natco six-spindle drill which also drills the corresponding holes in the hub flange. Beside the drilling operation on this spacer piece, the only machining operations which it requires are boring and facing of both sides.

The assembly of the wheel is carried on progressively. At the present time there are seven men in the assembly line, each with his own operation to perform. The capacity of this seven-man line is not as yet known, as a complete production schedule is only in process of formation. The operations in the assembly are simple and consist of first mounting the spacer inside hub and outside hub on the disk by means of a drift pin and one bolt. Two men take care of this primary assembly passing the wheels to the third man, who inserts the other bolt in the flange. The fourth man has an air-driven socket wrench which tightens

the nuts up to a certain tension, after which they are hand tightened for final tension.

The wheel is then passed to an inspector, who mounts it upon centers and checks the wheel with the indicating point of an amplifier gage resting against the disk. This test is made for roundness of the wheels and must check within .055 in. The variations as the wheels come through the inspection gage, however, do not show, as a rule, above .025 in. After this inspection, the wheels are passed back to the bench where the bolt ends are clipped off on a shearing machine and then, by means of a pneumatic hammer with the same operator, the ends of the bolts are peened over. The wheels are now ready for the priming coat of paint, which is given them in a spray booth immediately adjacent to the assembly line. In fact, the last man on the assembly line who handles the air hammer lifts the wheel from the assembly bench and places it upon the spindle in the spraying booth. A portion of the assembly line showing the inspection is illustrated in Fig. 8.

Some Newly Developed Electrical Equipment

MENTION has already been made in the news columns of the fact that the Robert Bosch Magneto Co., Inc., will put on the market a line of ignition and other electrical and automotive devices.

Various improvements in design and construction have been made in Robert Bosch magnetos in recent years, mainly with a view of extending the range of operating ability and to make the machines absolutely dustproof and waterproof. The higher range of operating speeds is required by modern engines of the multiple-cylinder type which can be run in some instances at speeds beyond 3000 r.p.m., while others can be throttled down to exceedingly low speeds. On the new models there are absolutely no live parts exposed. The low-tension cable, instead of being connected to a binding post mounted on the interrupter cover, is led into the interrupter housing through a substantially horizontal hole in the molded cover, and the high-tension cables are also connected in such a way that all live parts are fully protected.

The magnetos are made for four-, six- and eight-cylinder engines, in the standard size and also in a larger size for extra large engines. A novelty is a miniature magneto designed for use on cycle motors and motors for scooters. This machine weighs complete only 2¼ lb. Being designed for use on single-cylinder engines, there is only one cable connection—the high-tension connection to the spark plug. No low-tension connection for a switch is provided, as the operation of the magneto is stopped by shifting the interrupter lever to a point beyond the working range.

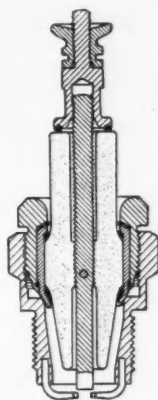
Another new product is a combined magneto and generator specially designed for use on motorcycles. This is probably the most compact combination of this type that has ever been developed, a new principle being made use of in the construction of the magnetic field. The generator is of the standard cylindrical four-polar type and its field frame is made part of the magnetic circuit of the magneto. There are two flat magnets which form the magnet poles, while the cylindrical field frame forms the central part of the magneto field structure. Thus the magneto armature lies close to the generator field ring, and the whole structure is exceedingly compact. At the same time the problem of magnetically insulating the magneto field from the generator has

been eliminated. The generator of the combination has an output of 30 watts and is wound for 6 volts. Its voltage control is such that it can be used without a battery floating on the line.

An impulse starter which requires only a small turning moment to operate and cuts out at a low speed has also been developed.

A spotlight of neat and substantial construction is also being shown by the company. This comes with an integral switch and a universal bracket so that it can be aimed in any direction. Another new product is a double diaphragm vibrator horn. Of the two diaphragms of this device one has a relatively low and the other a high rate of vibration, which combination is claimed to insure both wide carrying range and absence of undue harshness. The horn is much more powerful than the average vibrator horn, and it is said to draw much less heavily on the battery than motor horns, for the reason that inertia effects are reduced to a minimum.

A new spark plug of the spearable type has recently been developed by the Robert Bosch Co. As will be seen from sectional view herewith, the insulator is held in the gland nut, which has its lower flange spun inward. Copper gaskets are provided on the shoulders of the insulator. When the plug is taken apart the gland nut, insulator and central terminal come out together. The insulator is not then absolutely rigid in the gland, but it cannot come out. A gas-tight joint is assured by the lower edge of the gland nut pressing against a conical surface of the outer shell. This is a ground joint and is claimed to be absolutely gas-tight. The central terminal screws into the insulator and consists of a steel outer end and a non-oxidizing inner end. In this new plug there are two electrodes in the outer shell, instead of three, as in the one-piece plug, these electrodes having arc-shaped ends. The plug is deeply recessed and therefore should not readily foul, but should a conducting layer of carbon form on the inner, exposed end of the insulator, the plug can easily be taken apart and cleaned in the usual manner.



Most Factories Give Trucks Test Before Marketing

Manufacturers replying to questionnaire of AUTOMOTIVE INDUSTRIES agree almost unanimously that dealers should not be required to sell trucks unless the cars have proven their efficiency. Methods applied vary to some extent but in most cases a road test under capacity load is used.

A GENERAL opinion seems to exist among manufacturers of motor trucks that their product should be given a thorough test before it is shipped to a dealer. Results of a survey made recently by AUTOMOTIVE INDUSTRIES showed that most manufacturers hold that not only the public, but the salesman handling an article, is entitled to be assured that it can meet the tests claimed for it in sales talk and advertising literature. Just to what extent these tests should be carried out was a question on which some manufacturers disagreed, although approximately 80 per cent of the factory heads who replied were of the opinion that runs of about 50 miles with a capacity load should be made before a truck is allowed to be sold.

The following questions were embodied in the questionnaire sent to the manufacturers:

- Do you test trucks?
 - Should they be tested?
 - Do you test under load?
 - Each part?
 - Is the expense of testing charged against the sales or manufacturing department?
- A tabulation of the replies to the questionnaire shows the following figures:
- Do you test trucks? Yes, 41; no, 2; blank, 4.
 - Under load? Yes, 40; no, 2; blank, 6.
 - Each part? Yes, 5; no, 0; blank, 42.
 - Expense charged to manufacturing? Yes, 12; no, 0; blank, 35.

From these figures it will be seen that of 47 replies received to this set of questions there were but two manufacturers who said their firms did not conduct tests before allowing trucks to leave the factory. It was interesting to note that the chief engineer of one of these concerns recommended that tests be conducted under load in order to bring out minor defects that might be overlooked in construction and which could easily be remedied if discovered in time. A typical opinion is expressed in the following quotation from one of the replies:

"Concerns which have a due respect for their output will not fail to make satisfactory weight tests before the trucks are turned over to the sales department. Just how a truck can be considered adequately tested before these load tests we do not see."

Small Defects Important

Many defects can be brought out in a road test of from 50 to 100 miles. While these defects might not seriously hinder the efficiency of the product, they are apt to create an unfavorable impression with the purchaser. As one engineer expressed it, "Even a squeak or a rattle would undoubtedly cast an adverse reflection on a new vehicle." On the other hand, a defect such as would

probably not be noticed by the man who buys a truck might exist. To all outward appearances the machine might be in perfect condition, yet a skilled mechanic who drives it for 50 miles could easily discern that trouble and adjust it satisfactorily at small expense and perhaps save the purchaser considerable time, money and wrath by so doing.

There were seven manufacturers who did not specifically state that their trucks are tested under a load. One replied that a capacity load was not used in all cases. The chief engineer of this concern, however, declared enough of a load was used to discover any lack of power, imperfect springs or defects in transmitting mechanism. One concern tests its trucks with a load 50 per cent greater in weight than the rated capacity.

Separate Part Tests

Testing each part separately apparently is not a general practice among manufacturers, as but five specifically stated that this operation was carried out. The others, however, did not say definitely that each part was not tested, and the conclusion might be drawn that, while such concerns do not deem it necessary to give all individual parts a separate test, the more important ones are pretty thoroughly examined before they are allowed to become a part of the whole. One company analyzes all raw materials it receives, and, as the parts are manufactured, they are carefully inspected and tested and, when assembled, the truck is given a thorough road test. An official of this company expressed the opinion that "any company which does less is not building their product with as much care as they should."

Another concern that does not test trucks under a load declared this was omitted because of the thorough tests each part is given before it is put into the machine.

The expense of testing trucks generally seems to be borne by the manufacturing department, rather than the sales organization. While there were but twelve specific answers to this last question, all of these said the cost was included as a part of the expense of production. The other companies indicated that the tests were made at the factory and did not indicate that the sales department had any connection with them.

The opinion prevails that it is the duty of the department producing an article to turn it over to the company's salesman or dealer in such condition that there can be no question as to its efficiency. "We do not expect our dealers or Sales Department to have any expense incurred by them," wrote the president of one concern, "but consider it the duty of the Manufacturing Department to deliver the trucks in perfect condition."

One factory has put into effect a system whereby the expense of testing their trucks, under full weight, is

borne by the factory, but should any defects arise within a week or so after it is sold, the expense of correcting these defects should fall within the budget of the dealer.

"We believe," this official wrote, "that the first 200 miles of the truck's life is the most crucial period, inasmuch as there is a greater tendency for things to become worn in and to become loose when the truck is new and seeing its first service. After the truck has run this distance, however, and is again readjusted and everything is made tight, it is ready to go to work.

"We urge upon our dealers that whenever they sell a truck, a certain amount of profit be set aside for this checking up, which should be made after the truck has been driven a week or two. We feel that this expense should be borne by the dealer who sells the truck and should be considered as a part of his selling expense."

Another point mentioned in favor of the manufacturer conducting the tests was the inability of the Sales

Department to properly and economically test a truck.

"So many different troubles arise, due to the inability or inexperience of the sales organization to test the truck, that it does not seem advisable for any sales organization to put any truck to a test unless taken up directly with the Engineering Department of this company."

On the whole, there seems to be little variance in the methods and kinds of tests performed before finished trucks reach the public. Of course, different factories have different systems. It is doubtful, however, if a uniform system of testing could be established, if, indeed, there was any demand for such a system. The product of each factory has individual characteristics, all of which are not contained in trucks made by other companies. Tests that would apply to one truck might not apply to another, and the engineers of various factories have certain ideas in mind when they specify certain tests to be applied.

Argentine Show Stimulation to Trade

THE enthusiasm with which the automobile, as a universal means of transportation has been received by the Argentine Republic during the past ten years is tersely indicated when a comparison is had in the number of automobiles in daily use at the present time, 75,000, with the number of vehicles employed in 1911, approximately 10,000.

Perhaps there is no country in all Latin-America where the use of the automobile as a real necessity in everyday life has been so generally adopted as in Argentina. Immense areas covered by the farms and ranches out of reach of the railways cause the automobile to be a practical necessity for rapid communication between distant points not served by rail facilities.

The universal demand for automobiles has met with a ready response on the part of Buenos Aires importers, who, for generations past have been accustomed to anticipate the demands of the country and seek to supply the same from foreign sources. So decidedly is this the case that at the present time there are approximately 150 automobile importers established in the city of Buenos Aires alone.

Some four years ago the Touring Club Argentine undertook the inauguration of an annual automobile show, which met with most marked success. This initiative has subsequently been followed up during the months of October and November of each year. The expositions are held in the "Pabellón de las Rosas" situated on Avenida Alvear, near the Palermo Park, the city's most fashionable thoroughfare. The shows have at all times met with the decided support of all automobile, truck and tractor importers and the daily attendance at the show has been made up not only by residents in Buenos Aires, but also by crowds of visitors from all interior points.

It has been impossible to obtain statistics regarding the number of sales effected at these shows. However many sales are closed by the throngs of salesmen attending the various exhibits and without doubt many prospective purchasers, while not placing an order during the exhibition, are nevertheless strongly influenced toward this end by the opportunity of comparing under one roof the merits of the many cars exhibited. From the importer's point of view these shows are also very productive in securing new agency connections for distributing centers, since practically all automobile dealers in Argentina make efforts to visit the exposition. Naturally it is well to bear in mind that the foregoing statements have to do with those expositions held during the past four years

when the general business situation in Argentina was exceptionally good and it is therefore difficult to express an opinion as regards the merchandising possibilities of the forthcoming show to be held next November.

Plans for the next Annual Show during the latter half of November are now being rapidly whipped into shape and even though this show may not be held on a scale commensurate with former expositions, there is no doubt but that the larger and more responsible importers of automobiles, trucks and tractors will place on exhibit their products as in previous years. The possibility exists, of course, that a number of the smaller importers will not take part in the exposition due to their desire for exercising the strictest possible economy in their efforts to tide over the present period of hard times. Moreover, those automobile men who are close observers of the buying psychology of the Argentine people are inclined to be exceedingly pessimistic, knowing as they do the tendency of Argentines to over-spend in times of prosperity and to under-spend when the slightest signs of business depression appear on the horizon.

However this may be, the value of the show in stimulating trade is as well recognized by Argentine dealers in automotive products as it is by their confreres in the United States, and it will be taken advantage of by all of those live manufacturers and dealers who realize the potential possibilities of this market, and, are willing, even at the cost of considerable outlay in time and money, to cultivate this field in the hopes of obtaining a firm foothold here against the time when business has again become brisk.

A CAST-IRON research association has been organized in Great Britain and it is hoped that by intensive research the iron foundries may regain some of the trade they have lost in recent years to the drop forging, steel pressing and die casting industries.

In no other country in the world, it is said, has the cast iron industry been more encroached upon in this way than in Great Britain. The malleable cast iron section has suffered particularly. Of the 3000 foundries in the country, 170 produce malleable cast iron. Whereas Great Britain was at one time the largest producer in the world of malleable cast iron, its output to-day is only 66,000 tons per annum, as compared with 1,500,000 tons in America. The average output in Great Britain is but 8 tons per week per foundry, whereas in America it is 100 tons on the same basis.

America's Power Resources

The power resources of this country are the very basis of our national and industrial greatness, hence a knowledge regarding them should be possessed by every citizen, and especially by manufacturers and engineers. Waste in their recovery and uses aggregates billions of dollars annually, a fact which makes it vastly important to study the subject.

PROBABLY no natural resource is of such great importance to this country as that of power derivable from coal, oil, gas and water, yet the public, including manufacturers, engineers and others whose business it is to utilize these resources is, on the whole, poorly informed if not totally ignorant regarding the status of these resources and their relation to our economic system.

To illustrate this fact, it may be well to point out that if this country were in the midst of great business and industrial activity, it would be facing this winter a severe coal shortage such as that which caused the closing of many plants in the winter of 1917-18. Yet there are few who appreciated the reason for that condition or are aware that it seems certain to recur; much less have steps been taken to prevent its recurrence. Shortage of rail transportation is by no means the only factor in the situation. It is inherent in our outworn system of energy distribution.

This and many other facts of equal or greater significance are set forth in the book by Chester C. Gilbert and Joseph E. Pogue entitled "America's Power Resources."

This volume should, we feel, be studied by every manufacturer and engineer, not as a matter of academic interest but because without the knowledge and perspective given by a study of this kind, it is impossible to grasp the full meaning of the present fuel and power situation, and without such understanding the necessary concerted action among fuel producers, distributors and users which alone can solve the situation, cannot be brought about. The defects of the situation, now temporarily mitigated by the current industrial depression, will if allowed to continue bring about in time an intolerable condition, with serious consequences to the entire industrial fabric of the country.

While the book deals with a more or less technical subject, it is by no means technical in character. While it is written for the layman, it will prove equally interesting to the engineer, and for a book of its kind is unusually readable.

In this review we quote extensively from important portions of the text, supplying only such connecting passages as seem necessary. It need hardly be said that one must read the book in order to secure a complete and thorough understanding of the subject.

The introductory chapter deals with human labor and mechanical work and shows how the development of social consciousness and rising wages have made necessary the increased use of and efficiency in mechanical means for multiplying production. Chapter II, on the foundations of industrialism, shows that

Modern civilization is dependent upon the accomplishment of more work than human labor is capable of performing. This multiplication of human effort is brought about through the utilization of the energy stored up in natural resources—coal, oil, gas and water-power.

The United States possesses the most extensive energy resources of any nation in the world, producing annually three-quarters of a billion tons of coal, one-half billion barrels of petroleum, 700 billion cu. ft. of natural gas, and ten million horsepower of hydro-electricity. We supply nearly one-half the world's coal and over two-thirds of its oil.

It would require the labor of three billion hard-working slaves to accomplish the work done annually in the United States by our energy resources. The use of energy materials gives to each man, woman and child in this country the equivalent of thirty servants. Our type of civilization arises from this organized use of animated energy.

But our energy resources themselves and the means for handling the materials from which they are realized have been left to a haphazard development without plan or order. Furthermore, in bringing into use the materials from which power is developed we have sacrificed a high percentage of these valuable materials. For example:

For every ton of coal produced, our methods of mining have placed a second ton beyond recovery; for every thousand feet of natural gas turned out, a similar quantity has escaped; and for every barrel of petroleum that has seen useful service, several barrels have been wasted. These losses are inherent in the excessively competitive methods of production followed in this country and have caused no great concern, as it has been generally felt that the unmined supplies of the materials were so vast that distant generations alone would feel the loss. Recent inventories of the unused portions of these resources, however, go to show that such is not the case—that our best and most convenient coals will be depleted in a few decades, that approximately half of our petroleum is already used up, and over half of our natural gas is gone.

In addition the mere bulk of energy materials that must be handled has become so great that a critical problem in transportation is created. Coal alone constitutes more than one-third of the freight hauled by our railroads.

Industrialism has outgrown our present inefficient manner of handling the energy contained in coal and rapid changes are due to come as the system is found increasingly incompetent to sustain the forward march of industrial growth.

Beyond this our current utilization of energy materials is for the most part inefficient in the extreme, and the four sources of energy supply have been exploited as competitors, the cheapest and most convenient one being drawn upon.

Thus the limited reserve of oil is being used in place of coal and waterpower; coal is doing its own duty and that of waterpower as well; natural gas, the ideal fuel for homes, is in large part devoted to the crudest of industrial applications; waterpower is largely neglected. For the sake of expediency, our most precious assets are being squandered at an unbelievable rate. The very abundance of supplies has made it unnecessary to take thought or care in their behalf.

We now face a transportation system incapable of accommodating industrial expansion and the requisite growth in coal production at the same time; an oil production which has reached its maximum; a natural-gas output that is on the decline; a water-power development that is stagnant. Yet the demand for an increased energy supply is not to be gainsaid. There can be but one way out—a change in the development of the resources which will give a higher percentage of energy service from the materials brought into use.

The issue has a twofold aspect. Under present methods of dissociated, bulk production, we can neither secure an adequate supply of energy to meet the needs of the immediate future nor hold the price of energy down to levels at which it can be used to fulfill its proper functions. Without an abundant supply of energy we cannot have industrial progress; without a cheap supply social progress cannot be maintained.

The time is rapidly arriving when organized society will take stock in a scientific manner of the drift of affairs and by means of the forces at its command direct its destinies to a favorable consummation. The energy resources lie so concretely at the bottom of human welfare that their cultivation cannot wisely be neglected.

In the third chapter the authors deal with coal which they term the basis of national welfare. It is shown that

Coal is more than accumulated energy; it is a storehouse of valuable chemical products as well, awaiting merely proper treatment to yield valuable commodities with no sacrifice of its energy content. A striking commentary on the undeveloped status of coal is the fact that nearly all of the coal consumed in the world is burned in the raw state, with utter disregard of the products of potential value thereby destroyed. Smoke is the ever-present evidence of this loss.

The nature of coal is outlined and the three principal kinds are defined, while a few paragraphs are devoted to its origin and geological formation. Coal formations underlie nearly a half million square miles of the United States and are widely distributed throughout the country, though the bulk of it comes from comparatively few regions. The character and relative importance of various fields is pointed out. Our coal resources are so vast that less than half of one per cent has been used to date, but estimates as to how long our coal supply will last are beside the point, as the coal mined today is the best in the country. Before long, perhaps within fifty years, much of our high-rank coal will be exhausted.

The practical question, then, is not how long in an absolute sense our coal will last, but when shall we have to make changes in our industrial structure because the conveniently located and high-grade coals, upon which concentrations of industry and specialized uses are dependent, are beginning to run short? That time is closer at hand than is generally realized and is a consideration which demands the fullest utilization of the remaining supplies.

Considerable space is devoted to the important matter of coal mining.

While the early mining of anthracite was very wasteful, marked improvement in engineering practice has taken place with the development of the industry. The mining of anthracite as to efficiency is now in sharp contrast to the conditions under which most of the bituminous coal is still produced.

It is shown that there is great difference between the methods followed in mining anthracite and bituminous coal.

A striking feature of bituminous mining is the lack of developed methods of storage, because of the tendency of the product to crumble and even take fire, which requires a steady flow of coal-cars past the mine mouth so long as the mine is operating. A shortage of coal-cars, in consequence, means a stoppage of coal-mining.

The production of coal in the United States is so wasteful, not only of coal itself, but of labor and capital as well, as to raise the question whether the status of coal-mining is adapted to the conditions under which coal occurs and the needs which coal must meet.

The country's most basic resource is produced through the medium of a thousand disintegrated units, working without concert and under conditions of destructive competition.

Bituminous coal-mining as an industry is beset by conditions which are the occasion of present wastefulness and the justification of apprehension for the future. Scattered and unorganized, most of the individual companies are small and financially weak; inadequate co-operation in engineering practice exists; new technical developments are slow of growth; coal is mined for the most part by obsolescent, long-established methods.

With no means of storage developed, the average mine can produce coal only when railway cars stand ready to receive it; a fluctuating demand, accentuated by seasonal variations, leads to

Do You Know

THAT our power resources stand at the very basis of our economic and industrial system?

That many economic difficulties are directly traceable to failure to understand the importance of these resources and to use them intelligently and economically?

That one-third of the country's freight is coal?

That unless conditions are changed, we are certain to experience in times of great industrial activity a coal shortage similar to that which occurred in the winter of 1917-18?

That industrialism has outgrown our present inefficient methods of handling energy contained in coal?

That our petroleum resources are already one-half exhausted and the remainder being consumed with reckless waste?

That three-quarters of the gas produced in this country is natural gas, nearly half of which is wasted with an annual loss of nearly a quarter billion of dollars?

If Not

and if you would understand the meaning and importance of these and many related facts regarding our fuel resources and their bearing upon our modern civilization,

You Should Read

the accompanying article and the book upon which it is based.

instability of operations; many mines must close down in slack months, with destructive effect upon the conditions and supply of labor. The supply of labor also is not equal to the capacity of the developed mines; hence a labor shortage always develops in periods of prosperity, when the demand for coal suddenly increases. For years until recently the price of coal at the mine ranged from \$1 to \$1.15 a ton, a figure so low that only the best and most easily obtainable coal could be extracted by the cheapest methods of mining, irrespective of the waste involved; the tonnage of thin-seam and high-cost areas sacrificed in the process amounts to more than half the total coal produced to date. Many districts have been burdened with a leasing system that obligated the company to remove a given tonnage each year, irrespective of market demand or price, with the result that the richest portions were drawn from seam after seam with irretrievable loss to present needs. The fixing of wages on the basis of thick and easily worked seams has imposed severe penalties upon inferior conditions, precluding the introduction of new and improved methods. Added to this, the policy of the Government, as exemplified in its anti-trust laws, has forbidden combinations and restrained co-oper-

ation, with the result that large-scale, standardized operations, a paramount and distinctive American achievement, are virtually lacking in the mining of coal.

The trouble with coal-mining is too much competition, resulting in a lack of balance between production, transportation, and distribution. Coal-bearing land is so abundant in the United States that an excessive number of mines have been developed. The productive capacity of the coal industry, in consequence, is far in excess of the requirements of the country. In addition, the demand for coal varies so from summer to winter that for the past thirty years the average working year has been only 215 days in length, leaving 93 possible working days when the mines were idle.

The coal industry is unstable, speculative, and unreliable alike to producer and consumer. The crying need is for stabilization. With proper operation, an excess mine capacity of some 150,000,000 to 200,000,000 tons and an excess labor force of some 150,000 men could be eliminated.

These conditions are particularly undesirable because they concern a product of fundamental importance. In efficiency of production, the coal industry is not to be compared with the other great basic industries, such as the iron industry or the copper industry. The difference is to be attributed to the competitive system of small-unit mining, which has prevailed in this country and indeed been perpetuated against a natural tendency otherwise, by a public policy hostile to combination.

The foregoing facts must be borne in mind in order to understand the need for so reorganizing our coal industry as a public utility rather than along the lines of unrestricted competition. The present system encourages great waste, for competition makes it profitable to mine only the richer portions of deposits, leaving much valuable coal unworked. The advantages of co-operative mining are realized in other countries and should be brought about here.

The great difficulties in the way of adequate distribution of coal by rail will, it is thought, result in the establishment of great power stations in the coal fields and the transmission of the electrical energy there generated to industrial districts where the power is consumed. Congress has authorized a "Superpower Survey" with a view to developing a unified system of electric transmission lines in the eastern industrial zone. This involves the recovery of commodity values in the coal as by-products, a phase of the coal industry which holds great possibilities but which is in its infancy in this country.

Present utilization of coal, therefore, involves a very low recovery of the energy content and an almost total loss of the commodity values present. This, of course, necessitates the production, transportation, and distribution of a much larger quantity than would otherwise be required; concentrates the whole cost, in respect to the consumer, upon the modicum of energy extracted; requires the imports of materials which might be manufactured from the non-energy components; holds back the development of latent possibilities in coal products; besmears with dirt and smoke an untold wealth in civic improvements.

Heretofore the need for a coal by-products industry was not generally appreciated, inasmuch as there was plenty of fuel; transportation difficulties had not loomed up; coal products could be purchased from Germany; nitrate could be imported from Chile; and, in general, the whole matter of coal was taken for granted.

The need for progress in this direction is very great, as will be seen from the following:

Our present annual coal output could be made to more than double its service, or—accepting the current service requirement as a standard—that less than half the output can do the present work and in addition make heavy contributions to the supply of fertilizers, motor fuel, and chemical products. The total loss, on the basis of this estimate, runs well above a billion dollars a year, or over ten dollars for each inhabitant of the United States. Of such measure is the average man's pecuniary interest in the full utilization of coal.

The industrial progress of this country has been sustained by the mining of an ever increasing quantity of coal, until the very bulk of the total has become a critical weakness in this country's industrial life.

As Herbert Hoover has remarked, the coal industry is "the worst functioning industry in the country." For adequate social and industrial advance, this industry should stand at the head of our basic industries, not at the foot.

Oil, the Accelerator of Progress

Petroleum, the sole source of gasoline, is of immense importance to the automotive industry, hence peculiar interest attaches to Chapter IV dealing with this subject. The magnitude of this energy resource has made possible practically all automotive development.

But since petroleum deposits of the United States have been drawn upon with extraordinary rapidity and the supplies have already suffered serious depletion, the matter of their approaching exhaustion assumes the light of immediate importance. The comforting assertion that such considerations may be safely left to future generations does not apply to petroleum.

The nature, characteristics, geological occurrence and location of fields is concisely covered, and particulars showing the degree of exhaustion of various fields are given. See Fig. 1. The petroleum industry is, it appears, far better organized than the coal industry, but is not coordinated throughout.

Considerable space is given to various methods used in the recovery of petroleum from the earth, and particular stress is laid upon the waste brought about by the competitive system of well drilling which puts a premium upon the use of wasteful methods. From 30 to 90 per cent of the oil is left underground, and it is probable that on the average less than 25 per cent of the oil underground reaches the pipe-lines. Some of this waste is unavoidable or inherent in present methods of recovery, but a modernization of laws governing petroleum mining, which now, in effect, are quite largely responsible for the situation, would alleviate at least one great evil.

The system of pipe-lines used to transport petroleum to refineries near the centers of population, the refineries themselves, their methods and system of distribution, are interestingly described. A brief historical outline of the application of petroleum products to commercial and other uses leads to the conclusion that

The prospective demand for motor fuel is so great that it is probable that eventually all the petroleum products now burned as ordinary fuel will be used in internal-combustion engines.

Concerning Natural Gas

The fifth chapter deals with the important subject of natural gas, its occurrence, characteristics, value, distribution and use. Many automotive manufacturers have made large use of this resource, but the failing supply has already forced the substitution of artificial gas, and is likely to do so in increasing measure in the future. Some industries have been forced to migrate on this account.

The waste which occurs in the exploitation of natural gas reserves and in the use of this valuable fuel is scarcely believable:

The history of the natural-gas industry of the United States "is an appalling record of incredible waste." The annual reports of the Conservation Committee of the Natural Gas Association of America "are stinging indictments of a criminal system, fostered by both the gas companies and the public, that has resulted in wasting more gas than has ever been utilized." Samuel S. Wyer of the Fuel Administration estimated in 1918 that the annual wastage of natural gas in the United States was equal to the current consumption—that is, 800,000,000,000 cubic feet. At 30 cents a thousand cubic feet this an-

nual loss would be appraised at \$240,000,000. The contemplation of such figures is staggering to the imagination.

The waste of natural gas does not concern future generations; these losses are being paid for to-day. In no direction is conservation more critically needed, nor more promising of such immediate returns, as in the realm of natural gas. In a few short months in 1918, the Bureau of Oil Conservation of the Fuel Administration effected economies which resulted in the saving of millions of dollars' worth of this valuable fuel, but with the coming of peace this valuable work, undertaken as a war measure, was terminated.

The cause of this waste and means for checking it are detailed, but cannot be outlined in this review.

Water Power, an Unused Annuity

Chapter VI, bearing the above title, makes it clear that

Despite the fact that electricity has been in common and growing use in this country for many years, it has effected virtually no change in the basic conventions of coal distribution, and has led to the development of a small fraction merely of the available water-power.

The water-power of the United States, converted to electrical energy, is capable of turning every industrial wheel and illuminating every street and building in the entire country. And, the resource is country-wide in distribution.

The present production of hydroelectricity in the United States represents roughly the equivalent of 55,000,000 tons of coal, whereas nearly 400,000,000 tons of coal go into the production of steam-power and carboelectric power.

Of course, the whole default may be attributed to the Government's lack of action, but the result of ill-advised legislation, while significant, has been exaggerated.

It must not be forgotten that coal and oil have been so bountiful in this country that only the cream of the deposits has been exploited; a project contemplating the development of a water-power site faces competition with such a situation. Our fuels have been mined on such an extravagantly uneconomical basis of opportunism that a superabundance of coal and oil has been maintained on the market.

Fuel resources are fixed in quantity and are in the nature of capital which does not draw interest; waterpower, on the other hand, may be compared to an annuity, the annual increments of which lapse if not currently used. Hence, as a concession to convenience and in the flush of resource wealth, this country has run into the economic impropriety of drawing upon its energy capital while neglectful of its energy annuity.

Commonly as much as a fourth of the coal-fired power employed in centers of population has its energy applied in the form of electricity. Yet, with the rarest exceptions, this energy is transported to the centers of use in the form of coal and there the electricity is generated in steam-power plants. Electric-power usage has merely been appended to the established structure of steam-power practice, with the result that the employment of power has been greatly facilitated, to the further aggravation of the broad problem of transportation. So far the very force that has the capacity to correct the transportation evil has merely served to accentuate it. By virtue of electricity more power is consumed, more raw materials are required, more goods are produced, more coal is freighted.

Particulars concerning the various influences which hold back the development of water power make interesting reading, but space limitations prevent their inclusion here.

Chapter VII is devoted to a consideration of smokeless

fuel, the supply of anthracite and bituminous coal, coke, gas, etc., and the relation which they bear to industry and the need for heat in the home.

About two-thirds of the coal consumed in the United States goes into the production of power which is divided almost equally between the industries and the transportation systems; about one-sixth is used as a raw material for making substances employed industrially, such as metallurgical coke, upon which the iron industry depends, and gas, nitrogen compounds, benzol, tar, and coal-tar products. One-sixth approximately is employed for heating homes and other buildings. It will be observed, then, that the combined industrial requirements outweigh the needs of the home five to one.

It is shown in Chapters VIII and IX that our whole industrial system is dependent upon an adequate supply of power, and that

Transportation is the throat of industry, through which all of its materials enter and emerge. Upon the size and flexibility of this opening depends the rate at which industry can grow. From a broad point of view it would appear that the transportation problem cannot be adequately solved without due attention to the matter of power. Effectiveness of transportation involves three factors:

1. The employment of the equipment best suited to the task.
2. The advance elimination of superfluous weight.
3. The full utilization of the material transported.

The energy in coal is not concentrated before shipment, but is hauled in its substantial, bulky form; while the coal at its destination is not used so as to yield anywhere near its full service.

Energy is virtually the only natural resource product susceptible of concentration that is shipped broadcast in the crude condition. The dictates of demand, it is true, still call for a large proportion of the supply in the crude state, and

to this extent concentration in advance is obviously impracticable. But the order of requirement is changing rapidly, and even now over one-fourth of the call is for the concentrated product—electricity.

Not only are the railroads the chief haulers of energy in bulky form, but they likewise constitute the chief single consumer of this material energy which burdens their lines. The railways burn approximately a fourth of all the coal produced in this country, this item alone representing at least a tenth of their total operating expense.

It is commonly recognized that one of the weakest features in the industrial development of the United States is the over-accentuated responsibility falling upon the railways; any measure tending to lighten this weight obviously strikes at the roots of a fundamental and important issue. A plan for adequate inland transportation in this country is conceived to embrace: (a) airplane service for special mail and for passengers restricted in time; (b) motor-truck service for short-haul freight and in farming districts in co-ordination with parcel-post deliveries; (c) railway service for normal freight and passenger accommodations; (d) trunk-line, deep waterway haulage for slow-moving and bulky freight; and (e) transmission lines for the delivery of electrical energy from the coal-fields and water-power sites, in co-ordination with pipe-lines for the transmission of energy in gaseous form.

The coal applied to the production of power amounts to nearly half a billion tons, and is hauled chiefly by the railways to its multitudinous points of use, although in many instances as much as a quarter of the supply is there turned into electric power. This method of handling coal imposes a tremendous burden upon the railways, leading to congestion and shortages

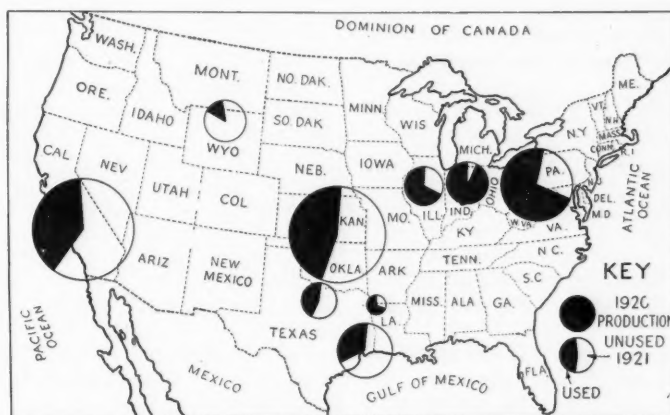


Fig. 1—The eclipse of petroleum. Map shows degree of exhaustion of principal oil fields in the United States

in periods of business prosperity when the demand for coal enlarges and the quantity of other materials demanding transportation at the same time increases. The use of fuel oil and crude petroleum for purposes of steam raising and the like, which is considerable and represents over half of the total consumption of petroleum and its products in point of bulk, sustains a gross overproduction of petroleum, and in consequence contributes markedly to a premature exhaustion of that resource, with initial effects already in sight.

Fuel Demands of Automotive Transportation

The construction program of the automotive industry affords no prospect of let-up in the pressure of fuel requirements. On the contrary, the injection into the situation of a notable capacity for truck production introduces an element that bids fair to overshadow even the tremendous automobile demand, while the item of tractor manufacture looms ahead with a fuel significance scarcely second in importance. And the production of aircraft, with their high fuel consumption, is scarcely under way. If the drift of these matters be projected into the future unabated, it is evident that the supply of motor fuel will have to be doubled every few years. The automotive industry is young and vigorous, and its continued expansion will place an unexampled burden upon the motor fuel resources of the country.

Those who count upon the discovery of new oil deposits materially to affect the basic situation overlook the fact that already for ten years new discoveries have been failing to do so, notwithstanding the sensational aspects of new developments when viewed separately.

Compared with the large and rapidly increasing annual draft upon the petroleum reserve, the supply seems startlingly inadequate to sustain for any satisfactory period of time the motor-fuel situation as it now stands. Moreover, it is well known, because of greater drilling necessary, that petroleum may be mined only at increasing cost and with increasing difficulty as the resource is depleted. It is already a common belief among petroleum engineers, that the oil output of the United States has reached its maximum, and the end of the present era of flush production in Mexico is in sight.

A big fraction of the domestic petroleum is gone; whether that fraction is one-half, as present knowledge indicates, or is one-third or even one-fourth, makes no difference in the consideration demanded by the situation. The fact remains that the size of the fraction has meaning to people using petroleum to-day and therefore represents an economic factor that must be reckoned with now.

It is, of course, very evident that the present tendency cannot persist to the point of even approximate exhaustion, because conditions, naturally arising, such as price increase, growing imports, and others, will serve to relieve the tension and thus spread the remaining supply over a greater number of years. But of practical importance is the period of economic stress that is ushered in when the resource faces a greater demand than it can fill in the customary manner. That is a period of readjustments to meet the new conditions, and arrives far in advance of physical exhaustion.

In short, as the situation is shaping up, the demand for gasoline is increasing more rapidly than resources and means are being developed to provide this product. Accordingly, a gasoline shortage, accompanied by a rise in price, is a prospect to be anticipated, if no means for relief are brought into action. A marked rise in the price of motor fuel, if not compensated, will retard the development of the automotive industry and hold back the whole field of activities dependent upon its unbroken advancement.

It will soon be necessary to bring coal and hydroelectric power to the aid of a growing number of those activities now dependent upon oil fuel. Benzol and alcohol hold better promise as blending agents in connection with petroleum products than they do as single fuels; but the utmost that may be expected from them in the calculable future is that they will augment by a small percentage the total supply of motor fuel.

Significant additions to the motor-fuel supply from oil-shales are still a number of years distant, and the whole matter cuts little figure in the immediate problem, however large ultimate contributions may turn out to be; although such volatile shale oil distillates as may come on the market may be expected to

find their way into the motor-fuel supply in the form of composite fuels, in much the same fashion as benzol and alcohol.

The automotive industry, theoretically, can stop the change now taking place in fuel by holding fast to the present engine in detail, but this procedure will so limit the supply and increase the price of fuel that in practice the engine will have to give way. It is concluded, therefore, that an era is arriving when the engine will have to make rather radical concessions to fuel, as a relief to a strained situation; and the problem before the automotive industry is, first, to recognize this situation, and, secondly, to establish means for making these concessions with the maximum easement to the supply and price of fuel. Anything short of this will mean just so much of a detriment to the growth of automotive transportation.

The paramount problem, therefore, is to insure, so far as possible, a parallel and complementary development of fuel and engine. This attainment is dependent, in part, upon the degree to which the mutuality of interest as between the fuel-producing industries and the engine-building activities is recognized and turned to use as a motive for co-ordination; in part, upon the degree to which the Government interests itself.

There is need for a steady progress on the part of the engine toward greater thermal efficiency. The average automobile is notably wasteful in its use of fuel, and the fuel supply may see its service doubled without an increase in volume, once fuel economy becomes a paramount issue in engine design.

Equalization of Industrial Opportunity

This subject is dealt with in Chapter X, and is a phase of industrial economics seldom given adequate consideration.

A co-ordinated and balanced development of the coal and water-power resources of the country will serve to equalize industrial opportunity and therefore to unify the economic interests of the country so that a constructive economic policy agreeable to all sections may win country-wide support. But in addition to its bearing upon national policy, a distribution of power advantages will make for an indirect but very significant gain in the matter of transportation; for industry may then strike a more perfect balance between the location of raw-material sources and markets.

The concluding chapter of the book deals with the subject of industrial evolution, and contains the following significant statements:

We are involved in a wasteful and careless exploitation of our energy resources, which is rushing upon us a premature depletion of our richest sources of supply and creating imminent problems in industrial readjustments of far-reaching significance. We have permitted, unchecked, the development of harmful concentrations of industrial activities in limited areas favored with fuel, to the creation and aggravation of labor problems that seem insolvable. We have seen our transportation system staggering beneath the sheer bulk of energy haulage, with a recent break-down in operation which clearly indicates the incapacity to function in periods of industrial expansion.

As a nation we have failed to sense that the inadequate development of our energy resources is responsible for a large measure of the social shortcomings that are present in our economic situation. The problem at bottom is one of education.

In short, we stand in need of a co-ordinated development of our energy resources to support a sound economic and equitable social advance. We need a system of production for our energy materials which will be in harmony with the geological occurrence of the resources, to eliminate the appalling waste of effort now taking place in their exploitation.

We need a new method of transportation for our bulkiest energy material, coal, which will be in keeping with our form value needs. The development of a common-carrier system of energy transmission lines will fill this want.

We need a revision in the methods of utilizing our energy materials, so as to insure a higher recovery of the energy content and a proper employment of the commodity values for the purpose of reducing the cost of energy. This result may be attained through a furtherance of the principle of multiple production, coupled with adequate attention to the efficiency of the appliances concerned in utilizing energy.

Unfortunately the Government, which should set the lead in this matter, has failed to sense its responsibility.

Heavy Demand for Motor Equipment in Oriental Nations

Love of display creates market for lavish trappings, loud horns and shiny radiator decorations. Manufacturers of accessories find bigger field for goods in Far East than car makers. Business increasing.

A CENTURY rooted sense of the dramatic, a childish love of gawdy or refined display and an inherent craving for the ostentatious in addition to being predominant Oriental characteristics from "somewhere East of the Suez" to points north of the maritime province of Vladivostok are the underlying factors of the motor car accessories market of the Far East. To the Oriental every day is a different act in the whole play, his life, and every moment he feels the responsibility of being the star of the cast.

The same inner prompting which recently brought one of the ruling war lords of the nation of China to have made to his order by an American manufacturer an armored limousine, equipped with machine guns, armor plate, non-shatterable plate glass, and arm slings for body guards mounted on the running boards, governs the lesser lights of the Orient in buying electric horns, dome lights, and radiator ornaments. The same tendency makes limousines popular with the older generation and screaming sportsters the desire of the young.

To the manufacturer of accessories in the United States the Far East, to a great degree, presents a market that is in almost direct contradiction to that of the Western countries. In this section of the world those devices which find increasing favor as "owner driver" accessories are a drug on the market. The element of cheap labor gives to the owner of even the lowest priced car in the Orient the ability to employ a chauffeur. More often there is also a footman. It is a safe estimate to say that 90 per cent of the motor cars in the Far East are chauffeur-driven. The motor car owner in the Far East in the majority of cases knows little and cares less about his car, his chauffeur's knowledge is confined to tinkering with the spark plugs and electrical connections, and if anything goes wrong the car goes to a garage where foreign experts are employed.

The firm belief on the part of the Oriental chauffeur that the majority of trouble in the working parts of the car can be traced to the spark plugs has created a market for these which is comparatively out of proportion to that existing in Western countries. This market is also increased by a demand from the marine activities of the various Eastern ports for use in motor boats.

"Squeeze" System Helps Market

Because of a lack of care lamp bulbs are also replaced with a frequency unparalleled by any Western country. Often, too, such breaks are not alone due to a lack of care but to a system which has grown up in connection with the motor car industry of the Far East which is the bane of the owner and the delight of the chauffeur.

This system is called in China "squeeze." In the United States it would be a commission. No matter in what business or occupation, the Oriental is always on the outlook for "squeeze." The garage owners, for the most part, have to pay a few cents commission on gasoline, more on

motor repairs and on everything that is done, to the chauffeur. This helps the spark plug market, as the chauffeurs soon learn to unload them. This also increases the sale of tires, lamps, and often moving parts of the engine and car.

Radiator decorations of the most lavish type find a ready sale in the Far East. On the whole the American manufacturer has not grasped this idea and has attempted to sell cheap pseudo comical figures when nickel plated, bronze and silver plated decorations of more classical design would have met with immediate favor.

Electrical Equipment Popular

Electric fittings of every description, step, dome, inside corner and other types of lights with fancy coverings in imitation of cut glass find a ready sale. Dash lights, in fact, lights of any description located any place on the car can be disposed of easily.

The Oriental love of display and personal advertisement finds solace and contentment in electric horns—the larger and louder the better. Hand horns are also fairly popular. The native is a slow moving individual as a pedestrian and it adds considerable to the enjoyment of a spin in a motor to be able to give these people a shock by means of a loud and deep voiced horn.

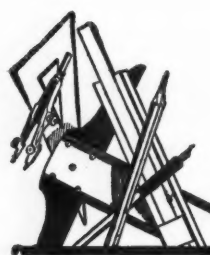
In China and India the rapidly increasing body building industry is giving rise to new markets for manufacturers of fittings and parts. These markets demand the highest grades of upholstery materials, beadings, window tassels and carpets. In the average native limousine these must all match with a high degree of exactness. Price is no object with the native buyer.

Most Cars Locally Built

While not within the realm of accessories proper, the styles of cars used will give an idea of the market generally. In the Far East closed cars predominate. For the most part they are locally built because the buyer and owner can have his own whims embodied in the making and also because with native labor these closed bodies can be produced in the Orient cheaper than they can be imported from the United States.

While the motor car business has suffered a slump generally throughout the Far East during the past year, the prospects for the future are taken in all sections to indicate a revival of former activities and constantly increasing business.

A DEMONSTRATION of the Case, Fordson, Glasgow, International and Titan tractors was recently held at Haifa, and with the Case tractor at Beersheba. As a result, endeavors are being made on the part of a few landowners in the Beersheba district to combine for the purpose of purchasing a tractor, and it is hoped that others will follow this example.



The FORUM



Front Wheel Wobble

Editor, AUTOMOTIVE INDUSTRIES:

Somewhat over a year ago the writer contributed an article to AUTOMOTIVE INDUSTRIES in which some of the causes of front wheel wobble were analyzed. He knew then (and stated) that the subject was treated incompletely and asked for suggestions as to other possible causes.

One such has recently been brought to his attention by Eric Wahlberg, chief engineer Nash Motors Co., the explanation of which was overlooked in the original discussion. It is very readily explained by diagram herewith.

Suppose the front axle be tilted so that the centerline of the king pin strikes the road either in front of or behind the point of contact of the tire with the road. Then if a side force is applied to the tire at the point of road contact, this will have a moment about the king pin axis the amount thereof depending upon the distance AB. On the other hand, the motion of the car will offer an opposing moment directly that the wheel is turned from the straight position, if the king pin is in the same plane as the wheel. With the conventional design of axle there will be a trailing or castering action at all times that the car is in motion because, both the front wheels being outside the king pins, they tend to spread apart in front.

Now the gyroscopic action of the wheel even at low speeds is quite considerable, which means that to deflect it sideways suddenly will require a fair effort. Once deflected the movement of deflection will continue until a sufficient opposing moment is encountered and hence a pendulum wobbling of high frequency can easily be started.

This it is, in bad cases of wobbling, that causes the whole front end of the car to shudder, without any perceptible vertical oscillation, an action that had greatly puzzled the writer and which in the original analysis he realized he could not then explain.

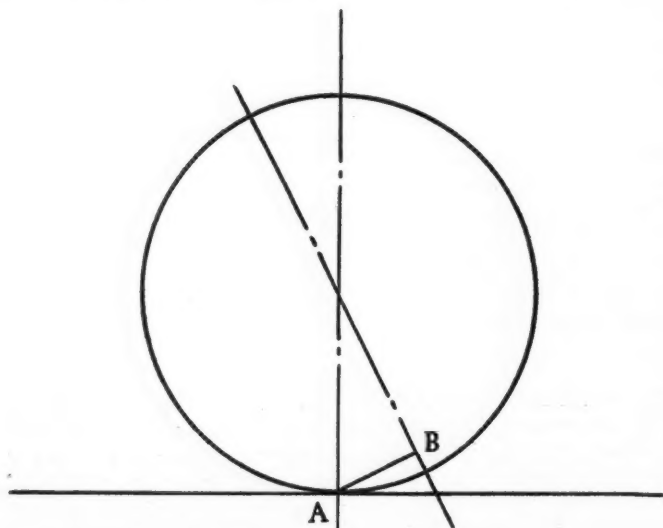


Diagram of front wheel with tilted axle

There are two positive cures for wobble. One is to use an axle with king pins set truly vertical; the other is to introduce sufficient friction to damp out the wobble or rather to "dead beat" it.

Wobble which develops in old cars can usually be cured by tightening up all the joints and connections in the steering. If it occurs in a new car it can usually be traced to excessive castering. If much caster is considered necessary the remaining alternative is to use king pin bearings with a fair amount of friction, not ball or roller bearings.

A. LUDLOW CLAYDEN.

The Fuel Problem as a Carbureter Problem

Editor, AUTOMOTIVE INDUSTRIES:

While hundreds if not thousands of pages have been written on the fuel problem, I fail to remember any discussion of it on the basis of self-evident and indisputable facts. I want to quote from one letter received by me several days ago from the engineer of a prominent carbureter concern, and also from the circular of one still more prominent. These extracts prove beyond question that the carbureter as applied to-day is really looked on as a metering device.

If these devices were actually productive of fuel efficiency there would certainly be no true grounds for charging waste. This fact is indisputable. But, beyond any question, a lot of the precious liquid gets by without producing results. There is a reason:

A rather clear, if homely, example to show why it is difficult to get fuel economy lies in the fact, as I have several times roughly figured out, that in a truly efficient use of fuel one common teaspoonful should give from 200 to 250 power charges to the cylinders of a medium-sized, 6-cylinder motor. This, based on around 20 miles per gallon, which should be easily possible. To break up a spoonful of liquid into this number of parts means extreme divisibility, and if this is not accomplished, it, of course, means waste.

Now it is another self-evident fact that to get true economy you must trap this excess before it gets into the cylinder or even manifold and not afterward, which would be like locking the barn door after the horse is stolen. It simply means real evaporation or extreme divisibility, which is about the same thing. This is not accomplished to-day, hence the fuel problem.

There apparently exists a rather hazy idea of this matter of vaporizing. Natural evaporation is confused with boiling. The first requires surface, the latter temperature. It is simply a question of surface in relation to bulk. Without hesitation I will say that it is perfectly possible to design a carbureter which will give the required surface and at the same time not only vaporize the liquid fuel but give a homogeneous mixture to the manifold for distribution to any number of cylinders. Not only will efficiency but economy of operation result therefrom. My firm idea is that when there was a

marked decrease in the volatility of fuel, no means were taken from the carbureter side to improve on natural vaporization, but it was left to the engine builder to provide artificial means by boiling, or, as one prominent expert has said in a recent paper, cooking.

I do not believe that a vapor thus supplied can give equality of mixture that is truly efficient and economical.

GEORGE M. BROWN.

Testing Aluminum Castings

Editor, AUTOMOTIVE INDUSTRIES:

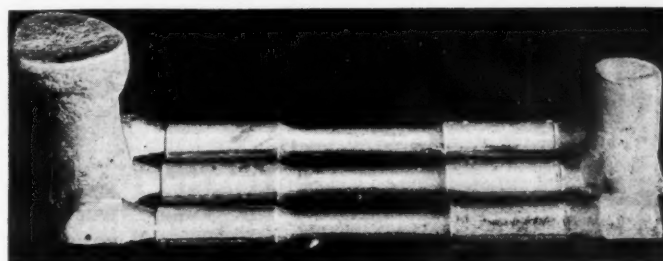
I wish to indorse Mr. Ernest V. Pannell's article on "Testing Aluminum Castings" printed in your issue of Sept. 1. Mr. Pannell has very ably defended the American practice of casting test bars of aluminum alloys in green sand as against the permanent mold method recommended by Dr. Rosenhain in your issue of Aug. 4. It is readily agreed that of two methods capable of giving the same degree of uniformity, the one giving results more nearly comparable with the physical properties obtained in actual castings should be chosen. It is my intention to show that by proper standardization, test bars cast in green sand can be made to show a satisfactory degree of uniformity.

The Engineering Division of the Air Service has adopted a method of casting test bars in green sand, as shown by the accompanying photograph. The patterns, including the gates, are made up on a match plate, thus insuring uniformity of molding. The mold is slightly tilted so that in pouring the metal flows up-hill. The pouring head and riser are 1 1/4 in. in diameter and a 3-in. cope is used. The results given in the following table represent melts of the standard No. 12 aluminum alloy (8 per cent copper) made up in the McCook Field Foundry, during the period July, 1920 to July, 1921. These results have been grouped according to the copper-aluminum hardener used, since it is believed that much of the variation in results obtained in aluminum castings can be traced back to the hardener used in the preparation of the alloys.

PHYSICAL TESTS

Aluminum alloy.....8 per cent copper, 92 per cent aluminum

Melt No.	Tensile Strength, Lb. Per Sq. In.	Elongation, Per Cent	Brinell	Scleroscope	Specific Gravity
<i>Cu-Al Hardener—Melt 55</i>					
155.....	21,980	1.50	...	...	...
<i>Cu-Al Hardener—Melt 151</i>					
220.....	20,800	2.3	...	...	...
228.....	21,380	2.5	...	...	...
229.....	20,310	2.0	...	...	...
Average	20,830	2.27	...	...	...
<i>Cu-Al Hardener—Melt 235</i>					
261.....	21,650	2.5	51.3	12.0	...
264.....	21,300	2.5	51.3	12.0	...
356.....	20,890	2.3	57.0	12.5	2.86
357.....	21,610	2.0	59.0	13.0	2.86
Average	21,360	2.32	54.7	12.4	2.86
<i>Cu-Al Hardener—Melt 300</i>					
346.....	24,130	2.50	...	...	...
361.....	22,720	2.35	58.3	14.3	2.86
664.....	21,580	2.35	58.3	14.0	2.84
Average	22,810	2.40	58.3	14.2	2.85
<i>Cu-Al Hardener—Melt 339</i>					
434.....	22,020	3.17	...	...	...
446.....	20,890	3.30	...	...	...
Average	21,460	3.24	...	...	...
<i>Cu-Al Hardener—Melt 437</i>					
466-1....	23,400	3.5	...	...	...
466-2....	22,090	2.67	...	...	...
469.....	19,398	2.16	56.7	15.0	2.90
492.....	18,250	2.70	...	...	...
506.....	19,560	2.0	52.6	15.0	2.86
529.....	19,630	2.5	55.3	14.3	...
Average	20,400	2.14	54.7	14.7	2.88
<i>Cu-Al Hardener—Melt 586</i>					
592.....	21,760	2.7	56.0	12.5	2.85
612.....	21,730	3.0	53.3	11.0	2.85
.....	20,650	3.0	54.0	12.3	2.84
629.....	20,890	2.5	54.0	12.3	2.84
Average	21,240	2.80	54.3	12.0	2.85



Test bars cast in green sand

<i>Cu-Al Hardener—Melt 821</i>					
895.....	22,260	1.50	58.0	13.3	2.85
<i>Grand Average</i>					
Tensile strength	.....	.....	.....	.....	21,300
Elongation	.....	.....	.....	.....	2.49
Brinell	.....	.....	.....	.....	55.4
Scleroscope	.....	.....	.....	.....	13.1
Specific gravity	.....	.....	.....	.....	2.86

The results given for each melt are the average of the three test bars cast as already indicated. The results from the three bars always agree very closely, except where there are obvious flaws, which reduce the strength of any one of the bars. For ordinary purposes, it is not necessary to cast three bars, two being sufficient, one to be used as a re-test in case the first bar shows a flaw. However, for experimental work, we have found it very desirable to cast the three bars in the same mold.

It is a well known fact that the physical properties obtained in an aluminum test bar depend to no small extent on the pouring temperature. In general, the lower the temperature, the higher the physical properties obtained. For this reason it is the practice in our foundry to pour the test bar mold just before pouring the casting, thus the test bar is poured at a slightly higher temperature than the casting, and, therefore, the results obtained are conservative.

E. H. DIX, JR.,

Chief, Metals Branch,
Material Section,
War Department Air Service.

Better Vehicle Repair Methods

THE second edition of the Automobile Repairman's Helper is so greatly enlarged and so radically changed that it bears little resemblance to the first edition which was printed some two years ago. The contents consist of the Better Mechanics articles, which have been appearing in Motor World for the past four years, and these are edited and arranged in an orderly manner with a complete index so that any subject or any car or truck can be located very quickly. The book is the work of S. Thornton Williams and J. Howard Pile.

The articles were prepared with the thought of assisting motor car mechanics to better methods of care, repair and maintenance of motor vehicles and in the preparation of the material over 2000 shops have been visited in various parts of the country, factory service departments called upon for data and various methods of performing operations observed and studied.

The present edition, including practically all articles up to date, has become so large that it was necessary to divide it into two volumes. The first volume, now ready, takes up building design and layout, systems for saving time and money, shop equipment, standard shop practice on cylinders, electrical systems, batteries, bearings, etc.

Volume II, which is in preparation and will be printed shortly, takes up other problems of the repairshop and gives detailed shop operations on a number of other cars and component parts such as clutches and axles.

Washington Unemployment Conference Deserves Attention

Fixed habits of work and non-flexibility of men in ability to do more than one job is one factor in the present situation. Tendency of the public is to charge industry with the responsibility for unemployment. Conclusions of conference will develop effect produced by this tendency.

By Harry Tipper

THE opening of the President's conference upon unemployment is a reminder of the fact that we have an unemployment problem of considerable proportions, and that this problem assumes a public character because of these proportions and the impossibility of any single agency providing the alleviation from the attendant troubles.

As members of one of the largest industries, the automotive manufacturers should be very much interested in the deliberations of the conference at Washington and in the proposals emanating therefrom.

The character of the conference indicates the general belief that this problem is of such importance that it requires the consideration of every branch of opinion in the development of either temporary or permanent suggestions for its alleviation. The presence of the manufacturers, labor leaders and representatives of the general groups of the public means an admittance by the political bodies of the public interest in this matter and of the way in which the problem is affected by the industrial conditions of labor outlook.

This is the first time in the history of the United States that the unemployment situation has called for any public and political consideration. While there have been periods of considerable unemployment in the financial crises of the past, they have not been so widespread and they have not attracted the public consideration which has been demanded in connection with this one.

In the period up to the war the United States was possessed of a manufacturing capacity hardly equal to its requirements for domestic consumption. The excess in imports of manufactured articles over the exports of similar products was sufficient to show that the capacity did not quite reach the dimensions of the domestic consumption.

Since the war has ended the manufacturing capacity of the United States is, for the first time, larger than the immediate or probable requirements of the population, and, therefore, the unemployment question demands an attention not so visible at any period in the past.

The difficulty of maintaining continuous employment has grown with the subdivision of the industrial operations and the more rigid specialization in the occupational divisions.

Not so many years ago a machinist was a man who could turn his hand to the operation of any of the usual

machines in the metal trades or the manufacturing side. He was capable of making his own tools and fixtures and of adapting his machine to the production of various kinds of work. His skill, therefore, was fairly flexible and could be turned to a good many things in the course of a year's operation of the factory.

To-day most machinists are only operators of machines, capable of operating a limited range of machinery of the same kind and under similar conditions. Unless there is a sufficient volume of work in their own particular small occupational branch of the business, these men are unable to fill industrial requirements, and it is not unusual to see one department of a factory working overtime, while another department is on short hours.

The trade union development has added to the rigidity of this labor skill by organizing unions in different branches of the industry and defining the measure of skill which permits entry into such a union.

In some lines of industry these definitions have been carried so far that their interpretation has led to a series of functional strikes and many functional disputes arising out of a disagreement as to whether new operations belonged to one branch or the other branch involved in the particular industry. The building trade has been very prolific in these disputes, and some of them suggest the extent to which the definition of work has been carried by the standards of membership in the various organizations.

It is recalled that in building one of the important banks of Chicago, when the steel arrived for the building of the safety deposit boxes, the contractor was able to close the pavement on order from the city, and that he might not be delayed with this work he had the steel dropped to the basement by his regular rigging gang, so that the pavement above could be closed and the other work proceed. It appeared that this work was a part of the work of the safe-movers in one of their branches and they declared the regular riggers should not have been used for the purpose. Therefore, the safe-men called a strike on the building and refused to operate until the pavement was torn up, the steel removed from the basement to the sidewalk and put down in the regular way.

In a building in New York, several months ago, a new device was introduced for the purpose of improving the heating system. A question arose as to whether the erection of this part of the equipment belonged to the plumbers or to the steamfitters. The discussions of this point grew very acrimonious. Finally a strike was called because of this dispute and a month was lost before the question was settled.

These, of course, are extreme cases, but there is a general tendency—accompanying the continued subdivision of operations—to a greater rigidity of skill and a greater dislike for any change in the work which will call for adaptation of that skill to other operations.

This rigidity is primarily a psychological matter arising out of the fixed habits of work that become more difficult to change as they become concentrated upon fewer elements. It is enhanced by the organization of such men into groups and their attempt to define their own work for the purpose of developing standards of membership, apprenticeship and other matters.

The employment problem is very closely associated with this because the rigidity of skill and habit makes it more difficult to use the idle workers in any operations other than those to which their skill has been previously applied.

We are fortunate in this country in that a large part of our working population has not been trained in this specialized skill for more than one generation and retains as yet a measure of adaptability in connection with their work. Coming, as these workers do, from peasant classes and from farming occupations or from parts of the world where industry is not so highly specialized, they have been accustomed to turn their skill to a good many things, adapting themselves to each change of work. This capacity they have not entirely lost, and for that reason there has been a good deal of re-employment from the ranks of the unemployed, reducing the total problem in a measure and increasing the flexibility of the labor organization to that degree.

However, it should be noted that the industrial fabric can be maintained at such a perfect balance as to provide work for every worker at an equal pace in connection with the percentage of total production demanded by the market only when the manufacturing capacity is noticeably less than the market requirements and it is possible to employ all of the workers a reasonable proportion of the time. Considering the surplus manufacturing capacity possessed by the United States as a result of war activities, it is unlikely that we shall require all the labor in the same proportion for a number of years, so that the question of unemployment is likely to remain with us in some proportions, at least, over quite a period of time.

Whatever the manufacturer may think about the matter, or whatever may be the abstract viewpoint of the individual, this conference indicates that political authorities and practical business men believe the responsibility will be placed upon industry, the general population and the political governors in about equal proportions.

The reaction of the public indicates that, from the standpoint of the average citizen, industry must accept a considerable share of the responsibility for unemployment. Any political action in this direction, of course, will simply be in the way of taxing industry or forcing industry to do certain things because of political necessity.

In Great Britain and to a greater extent in other European countries the unemployment problem has required governments to control, subsidize or to engage upon industrial operations to an extent which would have been incomprehensible before the war.

In any case, industry must pay for the lack of employment directly in the industrial difficulties of small profits and slower turnover, while the consumer, of course, is charged with this addition to cost before the transaction is completed.

So long as the income of a proportion of the population is reduced materially by the uncertain character of its employment or the extent of its unemployment, the purchasing power of that portion of the population is diminished, the costs of industry are increased and the amount of product which can be secured is decreased.

Industry works at the best efficiency when everybody is sufficiently employed, but when there is no real shortage of product and no great competitive bidding for service. The balance of industrial employment is probably more effective at a normal product load than it is at any point above or below that. The purchasing power of the population is at its most stable point when industry is operating at normal load.

In a declining market, where every element of cost becomes important because the price cannot be adjusted to the cost, but the cost must be adjusted to the price, any inefficiency arising from partial load, unemployment and destruction of organization add automatically to the cost of the individual unit of production.

From these standpoints the manufacturer is primarily affected by the question of employment, and the methods of alleviating the present unemployment problem should have his careful attention. They may be only suggestions at the present time, without any binding force and with no particular weight, but they will affect public opinion to some extent, suggest further analysis to some of the interested observers, and the conclusions may return to embarrass the manufacturer later if their significance is missed and their tendency lost sight of when they are reached in the present conferences.

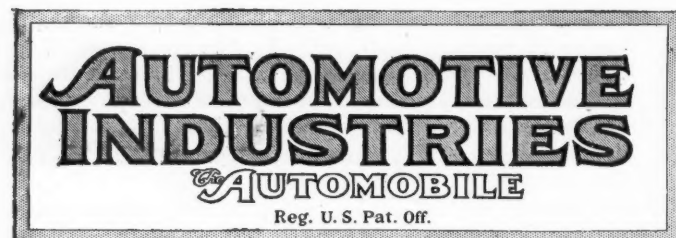
The unemployment problem has reached the consideration of the politicians and the public in a definite way for the first time in the history of the United States, although many suggestions have been made in this direction previously. That fact should warrant the manufacturer in considering the conclusions arrived at by the conference and in considering the effect which such conclusions may have upon his own outlook.

There is a general tendency, undoubtedly, to charge industry with a measure of the responsibility for unemployment and for its solution. Irrespective of its justice, this tendency shows some indications of growth, and the conference will develop in its conclusions the effect produced by such considerations in the deliberations of that body.

THE new number of the *International Labour Review*, the monthly magazine issued by the International Labour Office of the League of Nations, contains figures showing the huge development of trade unionism since 1913, 1919 and 1920 were 16,152,000, 42,040,000 and 48,029,000 respectively.

Of the total of 42,040,000 members in 1919, 34,061,000, or 80 per cent, belonged to European countries. Of the remaining 7,979,000 non-European members, 5,985,000 belonged to the North American Continent. Trade union membership is very marked in the United Kingdom, Germany, the United States, Russia, France and Italy, which accounted in 1919 for no fewer than 33½ million members, while the other 24 countries accounted for only 8¾ millions.

The four great industrial countries—the United Kingdom, Germany, the United States and France—included between them more than 28 million members, or 66 per cent of the recorded world total of trade union membership in 1919.



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Automotive Industries—The Automobile is a consolidation of The Automobile (monthly) and the Motor Review (weekly), May, 1902, Dealer and Repairman (monthly), October, 1903, and the Automobile Magazine (monthly) July, 1907.

Winter Repair Work

THE news columns of AUTOMOTIVE INDUSTRIES last week told of a movement started by Automotive Service Associations of New York and Brooklyn to avert the usual slump in winter automobile repair work. Their campaign includes spending \$16,000 in newspaper and folder advertising to urge the car owner to have his automobile overhauled during the winter months instead of putting it off until early spring when repair shops are rushed with orders.

To the manufacturer of automobiles who has service stations established in various cities throughout the country this campaign offers a suggestion. Whether or not combined action among the various repair men of the different cities was taken, individual effort could accomplish much. The advantages of such a plan are apparent. Not only would the service station be made a paying proposition during the winter months, but the car owner would also derive benefits in that there would not be the long wait for his car in the spring while other machines were being overhauled. The work would be done at the

time he uses his car the least and the repair man would be busy the year round.

This system, if put into effect, would not likely result in decreased business during the spring, for enough work will come in to keep the shop running at full speed. During the spring the service man can take care of only so much business and he often has to turn away many prospective customers. If it were possible for him to persuade his regular customers to bring in their cars during the months between November and March he would find that his shop would be filled with new customers when the spring rush started.

While primarily the move was started in an association there would be nothing to prevent the individual service man to launch a similar campaign among car owners in his territory.

Progressive Car Development

IN commenting upon the handicap which the present status of the used car market places upon the sale of new cars a prominent engineer, who is also an executive holding a high position in the industry, recently said that the best if not the only way to overcome this handicap, so far as it affects the near future, is to build new cars which are so far superior to used cars now available that no user will have one of the latter type. To which the immediate rejoinder is, can it be done?

It not only can but it will be done, not, of course, by the conservative sit-tighter who changes nothing until the other fellow shows him that he can't live unless he improves his product, but by the progressive who has vision—who analyzes the shortcomings of that which is, and sets an ideal for the performance of the future product toward which he continually strives.

What, then, is this new car to accomplish which the present-day car fails to do? Primarily, it must be more efficient, not only in respect to fuel consumption—though this is of great importance—but in all factors which enter into the cost of operation. It must return more for each dollar spent upon it. It must be more dependable—freer from difficulties which demand attention by the user and by service departments. It must be accessible and easier to repair when repairs must be made. It must be more comfortable to ride in. It must handle as well as or better than the best we have to-day. This is not all, but it's enough to make food for thought, for experiment. It calls for but little information not now available—simply the intelligent use or combination of facts we already know.

Some people who have given the matter careful study believe that the car which will do 75 miles on a gallon of fuel is in sight. Experimental cars which have done this or but slightly less are already in existence. It is not too much to expect that performance in other respects will undergo a similar radical improvement. Much remains to be done in experimental development before improvements of this character are incorporated in the commercial product, but the manufacturer who is not following work

of this kind and not seeking to do his share in research upon which sound development is based is certain to suffer when he awakens to discover that his product is out of date and in no position to compete with that of more progressive contemporaries.

Power Resources and Their Conservation

WHEN a person stops to analyze the importance which power resources play in our modern economic system it is not difficult to see why our own country has become the greatest of all industrial nations. It is largely because of our endowment in coal, oil, natural gas and water power that we have achieved this greatness in competition with nations less well supplied with energy resources. There is danger, however, that we will fall into the habit of regarding our fuel resources as inexhaustible; whereas half of our petroleum reserve has already been used, the best of our coal deposits are becoming depleted, and our supplies of natural gas are failing rapidly. In the face of this situation we permit to continue an appalling and largely preventable waste in all our fuel recovery operations, and much the same can be said regarding the utilization of the fuel ultimately recovered.

No revolution in this regard can be worked in a day, but much can ultimately be done by education and by intelligent legislation. The automotive industry is a great consumer of fuel and is responsible for the production of equipment which uses a large percentage of refined petroleum. The intelligent conservation and economical use of our fuel resources is therefore a matter which we cannot safely neglect if we would serve our own best interests.

It is easy to be indifferent—to say that the whole fuel problem will work itself out in time, but indifference is a costly luxury when it concerns so important a matter as fuel, and those who indulge in it must expect ultimately to pay the bill. The wisdom of starting now to study and help work out a solution of the problem cannot be questioned. Read the article in this regard which appears on another page of this issue. We predict that you will find it worth while, to say the least.

Building Dealer Efficiency

THE schedule of topics announced for the N. A. C. C. members meeting which begins to-day indicates the probability of real progress in connection with an important phase of marketing—that of dealer relationships. Two out of the three topics announced for the general meeting have to do with this subject while the third is directly related to an important dealer problem.

The importance of satisfactory dealer relationships has been strongly emphasized by the experience of recent months, and a careful study of the problems involved is likely to be worth all the time and effort expended in this way. Merchandising costs throughout all industries have increased during recent years

in far greater proportion than have production costs. In fact, the latter have constantly decreased while the former have constantly increased. The efficiency with which the dealer organization functions in relation to the manufacturer has a strong bearing on these costs.

The facts are fully recognized by the majority of manufacturers, and definite progress is being made in many instances. The entire problem, however, is rather complex and a more fundamental analysis of the various factors is still necessary.

Increasing Punch Press Production

THE advances made during recent years in the production of pressed metal and stamped parts renders the punch press of constantly growing importance in production operations. There is, however, one definite objection to this machine. It is extremely dangerous to operate under ordinary conditions.

In many punch press operations it is necessary for the operator to place his hands between the jaws of the press twice. In a brief talk before the automotive section of the National Safety Council, A. L. Kaems of the Simmons company emphasized this danger in a striking manner. He put it in this way: "We have devised all kinds of safety devices, such as two-hand trips, push-buttons, gate-sweeps and others that have prevented many accidents, but just the same way as the railroad companies make us cross their tracks, so are we making our employees place their hands underneath the ram of the press twice every operation. Suppose a man does 1000 pieces per hour. That would mean his hand would be in the danger zone 2000 times per hour. In 8 hours it would mean 16,000 times and in 300 days 4,800,000 times. . . . You will agree that when a person is compelled to flirt with danger 5,000,000 times per year and is not injured he is just lucky."

The great production usefulness of the punch press renders specially necessary a more careful study of safety methods in connection with it. The difficulty with most of the safeguards devised has been that they tend to decrease the speed of production. Since most punch press operators are working at piece-work rates, this fact has, of course, led them to disregard or to render ineffective the safety devices. Where the operators were on a day-rate basis the management has been loathe to install such devices because of the decreased rate of production involved.

As pointed out by Mr. Kaems, however, a little careful study of individual operations will enable the manufacturer to find means of pushing or sliding the work into the die in 90 per cent of the cases. Some months ago AUTOMOTIVE INDUSTRIES described in detail how this has been accomplished at the Simmons plant. The idea is entirely practical and is comparatively inexpensive. The danger of injury to the operator is eliminated and the production of the machine is materially increased in practically every case. A more careful study of safety methods for this important machine will increase production and reduce costs.

Peerless Negotiations Consummated

Active Management Assumed by Collins

Approximately \$4,500,000 Involved—Initial Payment 20% With Rest in Serial Notes

CLEVELAND, Oct. 3—Richard H. Collins, who recently resigned as vice-president and director of the General Motors Corp. and president and general manager of the Cadillac Motor Car Co., through the purchase of a substantial block of stock today assumed the active management of the Peerless Motor Car Co., it is announced by Roland T. Meacham, investment broker, through whom the negotiations were closed. Approximately \$4,500,000 is involved in the deal.

New Directors Chosen

At a meeting of the directors of the Peerless Truck and Motor Co. immediately following the signing of the contract, Collins was elected president and general manager of the company. Resigning directors included B. G. Tremaine, F. S. Terry, Lewis Kittredge, Theodore Frech, Geo. Y. York and Harrison Williams. These were succeeded by R. H. Collins, Wilbur H. Collins, C. E. Sullivan, F. A. Trester, F. J. Miller and A. C. Earhart. The following directors remained on the board; H. A. Tremaine, Roland T. Meacham, Walter C. Baker, W. H. Staring and Geo. B. Siddal.

The deal is the result of negotiations which had been under way for several months and definitely sets at rest reports that Collins would only become a stockholder in the company without assuming active management. Under the terms of the agreement signed to-day, Collins agrees to purchase from B. G. Tremaine and his associates, who have virtually been in control of the Peerless company, a minimum of 50,000 and a maximum of 80,000 shares for \$50 a share.

Meacham Makes Statement

The initial payment will amount to at least 20 per cent and the rest will take the form of serial notes bearing 6 per cent interest and secured as collateral by the stock purchased. The fact that Collins expects to come here at once to live and assume active control of the company indicates to the financial district that he soon will be in the saddle in preparation for the 1922 season.

In making the announcement, Meacham said:

"I think this is the biggest thing that has happened to Cleveland industry in the last five years. Collins has long admired the Peerless principles of engineering, and has reached the conviction, after an intimate study of Peerless design and construction, that the line thoroughly embodies the quality ideals which have been his inspiration during his entire career.

"It has also been known to his intimates for a long time that Collins has had a high regard for the city of Cleveland, its people, its industries, its way of doing business and its future.

"With characteristic promptness, he has already formulated definite plans for the expansion of the Peerless business. Details of these plans will be announced from time to time."

All Time to Plant

Collins stated that he would give his entire time and attention to the big Peerless plant in Cleveland and that the company would continue to manufacture eight-cylinder motor cars.

"I am a firm believer in the principle," he said, "that the director or general manager of a big business like the Peerless Company is only a trustee, who must at all times be mindful of the interests of the four groups that make for the success of any enterprise, the stockholders, because they furnish the capital to carry on the business; the men who make the product, because they give it its intrinsic value; the men who sell it, because the success of the manufacturer depends on the success of the merchants who put the product in the hands of the public and the men who buy it, because after all, a large body of satisfied owners is the greatest asset that any business can possess and this satisfaction results solely from the policy of giving the customer a full dollar's worth of value."

Collins Versatile

Collins is considered one of the most versatile men in the motor car industry. While much of his effort has been along merchandising lines, he has a knowledge of manufacturing second only to his knowledge of selling cars. He went to the utmost pains to gain his intimate knowledge of manufacturing because he has always held that only by knowing what was going on in the factory could he most intelligently interpret his product to the buyers outside.

As absolute dictator of the policies of the Cadillac Motor Car Co. he doubled the company's yearly sales revenue, opened a branch house in Chicago, whose business expanded so quickly that within less than a year it was necessary to double the floor space of the buildings; planned and finished in Detroit a new sales and service building and designed and erected a new Cadillac factory that is said to be the world's most modern automobile plant.

When Collins' resignation from the Cadillac Motor Car Co. was accepted a few months ago, it was pointed out as a

(Continued on page 695)

Merger Is Completed By Steel Companies

New Corporation Has Outstanding 300,000 No Par Common and \$10,000,000 Preferred

MASSILLON, OHIO Oct. 3—Steel mill properties with combined assets in excess of \$20,000,000 have been brought together in the merger just completed of the Central Steel Co., the National Pressed Steel Co. and the Massillon Rolling mill Co., all of Massillon.

The new corporation takes the name of the Central Steel Co. and the following officers have been elected: Chairman of the board of directors and president, R. E. Bebb; first vice-president, F. J. Griffiths; second vice-president, C. C. Chase; third vice-president, H. M. Naugle; secretary and treasurer, C. E. Stuart.

The reorganized company has outstanding 300,000 shares of no par common stock and \$10,000,000 of preferred stock. The merger of the three companies brings the Central Steel Co. into prominent position among the steel producing corporations of the country with complete modern equipment and facilities for producing all kinds of commercial alloy steels, hot and cold rolled sheets, hot rolled strip steel and light structural steel sections in a combined annual output of 450,000 to 475,000 tons of finished material.

Several new buildings and new machinery were recently added to this property, most of which was put in operation last March. The plant as it is operating produces approximately 50,000 tons of sheet products annually and the arrangement is such that an increase of 50 per cent in production can be achieved without additional buildings or power equipment. The Massillon rolling mill plant was designed and functions especially as a producer of sheets for the automotive industry.

Irish Fordson Plant Increases Its Output

LONDON, Sept. 5 (By Mail)—After spending \$3,250,000 on the Fordson tractor enterprise at Cork, south Ireland, which was started in war time with the marked good-will and help of the local people, and amid much grumbling by interested parties on this side, it looked recently as if the enterprise was doomed to an inglorious end. Production fell off and the number of hands diminished to a few score. Trade has revived, however, and the works are increasing production, with nearly 1000 employed.

Earl Motors, Inc., Succeeds Briscoe

Car Will Also Bear Name of Executive

Arrangements Are Made Through Chicago Bankers for \$5,000,000 Additional Capital

JACKSON, MICH., Oct. 3—The Briscoe Motor Corp. and the Briscoe car will be supplanted in the automotive field by Earl Motors, Inc., and the Earl car, both the company and the car being named for Clarence A. Earl, former vice-president of Willys-Overland, who became president of Briscoe in March last. Five million dollars in additional capital will be put into the business, arrangements for handling the finances having been perfected by Earl with Chicago bankers during September.

In announcing the reorganization, Earl said the Briscoe directors had voted unanimously for the introduction of the new capital, necessitated through the fact that the distribution end of the business had been expanded by the addition of 20 new distributors and 240 dealers in the past six months, both the new financing and the new policies will come before the stockholders' meeting of Oct. 20 for final ratification.

Enclosed models of the Earl car, which will reflect a general improvement in the former Briscoe line, will be ready for delivery Oct. 15. Open models will be ready Nov. 1. For the present Briscoe cars are being produced, though most divisions of the factory are busy on producing parts for the new car.

Discusses Outlook

Discussing the outlook for business, Earl said:

"The action our board of directors has taken is really our first step toward expansion to meet a demand which we are certain will develop by the first of next year. The minimum capacity of our plants today is 15,000 cars annually. With general business conditions pointing to a strong revival of activity inside the next 90 days, we are laying plans to double our minimum and we are confident we will have all the business we can possibly handle in 1922 and more.

"In expanding our resources at this time, we are producing a new car with labor and materials purchased at present day costs."

Resources of Earl Motors, Inc., will include nine plant buildings and equipment covering 53 acres of floor space in Jackson, Mich., and an additional assembly plant located at Brockville, Ont., which has been producing cars for Canada and the British dominions.

The board of directors as now constituted consists of Earl as president; John Fletcher, vice-president of the Fort Dearborn National Bank, Chicago, treasurer;

directors, H. F. Wardwell, president of the Burnside Steel Co., Chicago; L. B. Patterson, vice-president of the Edward Tilden & Co., Chicago; Horace Delisser, chairman of the Ajax Rubber Co., New York City; Wallace G. Kay, Kay & Co., Detroit; J. Fletcher Farrell, Sinclair Refining Co., New York; J. Wissenback, Chicago, and L. E. Latta, secretary.

The factory executive personnel includes Kelly R. Jacoby, vice-president in charge of sales; J. R. Findlater, vice-president in charge of Pacific Coast territory; Walter J. Mery, comptroller; David Minard Shaw, advertising manager; Allen T. McKay and R. M. Cowham, assistant general sales managers; Clarence L. Thurston, export manager; Victor Jantsch, chief engineer; W. B. Jamieson, general factory superintendent; C. A. Woodruff, purchasing agent; J. L. Blyth, director of service; R. M. Chapman, assistant secretary; Leroy C. Allen, assistant treasurer and W. M. Zerby, traffic manager.

Built Up Willys

Earl is 47 years old and started his business career with the American Hardware Co. of New Britain. With this company he advanced to the position of vice-president, which he held until he resigned to become vice-president and general manager of the Hendee Mfg. Co. of Springfield. Oct. 1, 1915, he was elected vice-president in charge of manufacturing of the Willys-Overland Co., and until his resignation in December of last year was virtual head of the corporation's interests in Toledo.

The progress that the corporation made during the years of his association attests his ability in the production field as well as his high rank as a manufacturing executive. Soon after the beginning of this association circumstances forced him into fields other than within the immediate scope of manufacturing and resulted in his assuming nominal control of the Willys interests and with general supervision over all matters with the exception of policy and financing.

Senate to Discharge Federal Truck Debt

WASHINGTON, Oct. 3—Senator Townsend of Michigan has introduced a bill in the Senate for the relief of the Federal Motor Truck Co. of Detroit. The bill would authorize the Government to pay the sum of \$11,117.78 to enable the company to pay and discharge a liability for that amount on account of certain material purchased by it to be used in the performance of a contract with the War Department, a contract that was thereafter canceled by the Government without provision being made for the discharge of such liability.

Truck Market Shows Return of Business

No Curtailment Noted in Passenger Car Plants—Collections Continue Good

NEW YORK, Sept. 30—Business in the automotive field continues surprisingly good considering the fact that September usually is one of the duller months. There has been no material curtailment in production in passenger car plants and the truck market is showing signs of life as is evidenced by the resumption of dividend payments by the Republic Truck Co.

Makers of parts and accessories report that their business for September is better than it was for August. This is particularly true of orders for unit parts such as frames and engines. Sales by parts makers in August were slightly better than in July.

Particularly encouraging is the fact that collections are good and that past due accounts gradually are being whittled down. The volume of notes outstanding is steadily decreasing. The finances of the industry rapidly are becoming stabilized.

Co-operation Apparent

Retail sales of passenger cars in most sections of the country have remained practically stationary for the past three or four months. The natural tendency from now until the first of the year will be downward but surprising interest is being shown in enclosed models.

There is evidently throughout the industry a keen desire to co-operate. This is demonstrated by the decision of the members of the National Automobile Chamber of Commerce to discuss at their annual meeting this week the question of how they can help dealers finance themselves through the winter and what can be done by manufacturers to help solve the used car problem.

The Automobile Underwriters Conference has accepted the contention of the automotive industry that due recognition has not been given in the past to the "moral hazard" in automobile insurance and that this has been largely responsible for the heavy losses incurred in the past two years.

Marked Gain Shown By Willys-Overland

**Present Daily Output 300 Cars—
Recent Payments Reduce Loans
to Less Than \$20,000,000**

TOLEDO, Oct. 3—Retail sales of Overland and Willys-Knight cars have made a marked gain since the last price reduction and since a reorganized sales policy has been announced to some of the dealers. Sales for the first three weeks in September were 223% as compared with the same period in the previous month. Shipments from the factory increased 116% over the same period in August.

Along with the increase in general business has come considerable betterment in the financial position and the company officials are looking forward to a year of capacity business beginning next March. The changes made in the sales policy are quite revolutionary and have not been fully announced as yet.

Efficiency Increased

It is understood, however, that most of the distributors of the company will be eliminated and the intermediate profits divided between the factory and the local dealers. This action follows the complete survey made of the field by President John N. Willys, who has been on the road for several months. He has increased representation of the Overland products by 410 dealers scattered throughout the country. It is hinted that the new alignment of dealer policy will be an economical change for the factory and result in placing Overland dealers in a position to meet competition with a big increase in business.

Production at the present time is 300 cars a day. The organization of factory methods under the management of Vice-President Charles B. Wilson has resulted in increasing efficiency so that 2.55 Overlands are now being produced with the same number of men as were formerly required to make one car.

Officials report that they have on hand cash amounting to \$8,000,000 and that loans have been cut to less than \$20,000,000 with recent payments. Inventories have been reduced to about \$18,000,000. When market conditions become more stable this item will be reduced to less than \$15,000,000.

Distributors Dropped

NEW YORK, Oct. 3—Confirmation has been obtained of reports current for the past ten days that the Willys-Overland Co. had decided to eliminate distributors from its merchandising organization although no official statement has been made by the corporation. It is assumed that the purpose of this radical change in policy is to produce more intensive sales effort on the part of the dealers.

It is understood that Guy Simon in Detroit and one or two other distributors will be retained. Harry B. Harper,

president of the Overland-Harper Co. of Philadelphia and former president of the National Automobile Dealers' Association has turned over his large holdings in Philadelphia to the factory.

A considerable number of new factory branches will be established and in nearly every case this territory will cover several States.

The new Philadelphia branch of Willys-Overland, succeeding the Overland-Harper Co., will be managed by George D. McCutcheon, who has been head of the Denver branch. Before going to Denver McCutcheon was branch manager for Buick at Atlanta.

Drake Is Appointed to Advise on Census

WASHINGTON, Oct. 4—J. Walter Drake, president of the Hupp Motor Car Corp. and director of the National Automobile Chamber of Commerce, has been named a member of a committee of trade and craft organizations to confer with the Bureau of the Census regarding a general schedule for manufacturers for the census of 1921. This committee is the outgrowth of conferences here in July with Secretary Hoover and officials of the Census Bureau. Modifications of the tentative schedule, which has been devised by the Census Bureau, will be suggested by this committee.

Because of its simplicity, the new schedule differs from past schedules and also varies with regard to the amount of information called for. As outlined, the new schedule covers the following items: Name and particulars of establishments as to location and lines of products; persons employed as salaried employees, including managers, clerks, etc., and wage earners, including piece workers; time and operation and products which will be detailed for the particular industries.

13 New Names Appear on New York Show List

NEW YORK, Oct. 6—Ninety-three companies manufacturing passenger automobiles will draw for space in the New York show at headquarters here of the National Automobile Chamber of Commerce this afternoon. Thirteen new names appear on the list and eight which have shown heretofore will be absent. The new companies are: Stanley Motor Carriage Co., Noma Motor Corp., Leach-Biltwell Motor Car Co., Cortland Cart & Carriage Co., Bournonville Rotary Valve Motor Co., Essex Motors, Yellow Cab Mfg. Co., C. H. Wills & Co., Handley-Knight Co., Durant Motors Co. of N. Y., Inc., Rickenbacker Motor Co., Kelsey Motor Co. and Ogren Motor Car Co.

The companies which have had displays at the show heretofore and which will not participate this year are: Allen, Brewster, Cunningham, Daniels, Lorraine, Piedmont, Scripps-Booth and Winton.

Locomobile Works Through Branches

**Company's Program Provides for
Production of 4 Cars Daily
and New Prices**

BRIDGEPORT, CONN., Oct. 3—Approval has been given to the plan for the continued operation of the plant of the Locomobile Co. here following the termination of the contract between the company and Hare's Motors, which had been in charge of the property for the last eighteen months.

The announcement of the company's program carries also a new schedule of prices made possible through modifications in the costs of labor and material. These prices are as follows:

	Old Price	New Price
4-passenger touring....	\$8,600	\$7,600
7-passenger touring....	8,600	7,600
Limousine	10,000	9,150
Sedan	11,700	11,000
Cabriolet	12,000	10,700
Coupe	11,400	10,500
Sport type (Double Cowl)	10,700	9,500
Landaulet	10,000	9,150

No Distributors

Under the new plan the company in merchandising its product will sell either through factory branches or dealers trading directly with the factory. It is understood that production will be limited to four cars a day. The factory is ample to take care of such a schedule.

Election of officers has resulted as follows: Elmer H. Havens, president; F. R. Hickman, vice-president and treasurer; E. A. Travis, general sales manager, all Bridgeport residents. Havens is a banker, prominent in the iron and steel industry in New England. His election has been in behalf both of the stockholders and of the other financial interests identified with the continued operation of the plant. Hickman was formerly identified with the company, having been in charge of its finances for many years. Likewise Travis returns to a post he filled for many years.

Plans Outlined

In a statement of the company's plans, embodied in a letter to the trade, Travis says:

"We desire to assure you that our plans call for strict adherence to the best traditions of the Locomobile company. We take justifiable pride in the prestige our product has earned through the years of pursuit of a well-defined policy of concentrating all our efforts upon a very limited number of vehicles, and building that number supremely well.

"We contemplate no radical changes. We shall build only the one chassis, the '48,' mounting upon it the standard types of coach work with which you are familiar; also designing through our custom body department particular types of bodies for patrons whose requirements are not met by our standard coach work. Our plans call for a gradual extension of the present activities in our plant."

Fisk Gets Contract To Tire Durant Cars

**No Fixed Number Stipulated—
Record Established in Getting
New Car on Market**

NEW YORK, Oct. 3—Durant Motors, Inc., has signed a contract with the Fisk Rubber Co. under which all its four cylinder and six-cylinder models will be equipped with Fisk tires, both cords and fabrics. The clincher quick detachable type will be used. The rear wheels of inclosed jobs will be equipped with cords. No fixed number of tires is provided for in the contract but they will be supplied as needed.

Competition Keen

There was keen competition for the Durant tire contract and negotiations have been under way for months. Several statements have been made unofficially crediting various companies with having obtained the business. Reports were heard some time ago that F. A. Seiberling, former president of the Goodyear Tire & Rubber Co., might become associated with Durant in the production of tires. It is understood there were some conversations on this subject but nothing came of them.

The Long Island City plant of Durant Motors, Inc., has gone into quantity production this week and is turning out from 50 to 60 cars a day. Actual production on a considerable scale was started Sept. 27. Ten cars were turned out that day and 13 the next. The output has steadily increased since then and it will be expanded as rapidly as possible.

Durant is proud of the showing made in getting the Durant Four on the market seven months after his engineering staff got to work on it. This is said to establish a record.

Lansing Starts Nov. 1

Credit of this achievement is given to F. W. Hohensee and A. P. Sturt, the chief engineer. Both these men went with Durant from Chevrolet. It was Hohensee, who was general manager of production, who was responsible for getting operations under way on a quantity basis in the Chevrolet plant at Tarrytown in less than two years. This was regarded as a record until he took over the Durant job. The experience gained in the Chevrolet undertaking was used to the best advantage in Long Island City. While installation of the conveyor system at Tarrytown took seven months it was only a matter of weeks in the Durant plant.

Production in the Lansing plant will start as scheduled Nov. 1. A few men are being taken on every week in the Muncie plant of Durant Motors of Indiana, formerly the General Motors Sheridan factory. The work of redesigning the Sheridan which will be known as the Durant Six, is nearing completion but no date has been set for beginning production at Muncie.

The Durant organization considers the

fact that it is now in quantity production sufficient answer to the contention of the Illinois Securities Commission, which has refused to allow the sale of Durant stock in that State on the ground that it is purely speculative. It might be stated that no formal application ever was made for permission to sell stock in that State, although inquiry was made as to what procedure was necessary and some stock was sold there.

The report from Springfield, Ill., that Durant Motors was refused incorporation papers is without foundation. The company never has made application for incorporation in Illinois and has no intention of doing so.

Friends and admirers of Durant are pointing to the fact that he has accomplished in the present period of depression a feat similar to that he put over in the panic period of 1907 when he went right ahead with construction work on the great Buick plant which at that time was the largest automobile factory in existence. He was warned at that time that there would be no possible market for the number of cars the plant was designed to turn out but disregarded this advice and went serenely ahead in the firm belief that there were unlimited future possibilities for the sale of automobiles.

It is significant that development of his present venture began after the period of depression was well under way and it is equally significant that his first factory is getting into production just as the corner has been turned and the business outlook is decidedly more hopeful.

Grand Prix Entrants Restricted by Ruling

PARIS, Sept. 22 (*By Mail*).—A piston displacement of 2 litres (122 cubic inches) has been adopted for the 1922 Grand Prix automobile race. The cars must weigh not less than 1653 pounds and the distance to be covered will be about 310 miles. This rule automatically eliminates all foreign competition. The French club has adopted as a basic principle that the race shall only be held if the competitors are 33 per cent French. With the 22 cubic inch rule for 1922, they are guaranteed a 100 per cent French race.

In addition to the speed test for purely racing cars, an interesting touring car race will be held on a limited fuel allowance. Officially known as the Touring Grand Prix, the race will be for a distance of 500 miles with four-passenger sporting type cars, having minimum body dimension, running on an allowance of gasoline equivalent to 13.8 miles per American gallon.

NO NEW ROLLS-ROYCE

LONDON, Oct. 3 (*By Cable*).—Rolls-Royce, Ltd., denies reports that it has ready for production a new four-cylinder 20 hp. car. The model which has been built is being used only for experiments as a part of the company's research program.

Predicts Few Types by British Makers

Lanchester Head Believes Individual Character of Automobile Will Be Continued

NEW YORK, Oct. 4—George H. Lanchester, who for 12 years has been responsible for the development and design of the Lanchester car manufactured by Lanchester Motor Co., Ltd. Birmingham, England, has been in America for several weeks studying the requirements of the American market for high priced automobiles. Lanchester is a brother of Fred W. Lanchester of worm gear fame and considered one of the leading engineers in Europe and one of the best mathematicians in the industry.

No Mass Production

George Lanchester believes that the individual character of the British automobile, which was a dominant feature previous to the war will be continued notwithstanding much that has been said since the armistice on British companies undertaking mass or quantity production of automobiles. So far the British concerns that since the armistice have aimed at quantity production have not succeeded, and Lanchester does not believe there is much possibility of any English concern succeeding in quantity production in the sense that American makers have carried it on.

Lanchester looks for a continuation of the individual character of car by the British manufacturer, and believes the strength of the British industry lies in this individuality. He believes that the majority of British firms will specialize on one or two models at the most, and that the wide range of models which characterized British makers previous to the war will not be continued, although at the present time there are several British manufacturers who are adding smaller models to their present wide line. Lanchester believes that this is merely a temporary situation due to the depression in the high-priced market and that some of the manufacturers are taking advantage to experiment with the smaller car field.

Lanchester Car Pioneer

The Lanchester car, which has always been a leader in individuality in the British field, was a pioneer in cantilever spring suspension, having used this form continuously since 1901. The use of a three-speed forward planetary gearset has also been a distinguishing feature. It has used the hour-glass type of worm-driven rear axle for many years, which was developed by Fred Lanchester, whom the industry recognizes as the father of worm drive. The Lanchester car, a six-cylinder design, with cylinders 4 x 5 in., is marketed in two wheelbases, 130 in. for four-passenger cars and 150 in. for other models. The chassis price is £1,950 for either wheelbase.

Allen Creditors Vote To Liquidate Affairs

No Financial Interests Found to Underwrite \$1,000,000 Necessary to Continue Operations

COLUMBUS, Oct. 3—At a meeting of the creditors of the Allen Motor Co., which has been in the hands of George A. Archer and William C. Willard as receivers for almost a year, a decision was taken to liquidate the affairs of the concern. This decision was made because of the difficulty of disposing of cars of a company under receivership.

This action was in line with the recommendation of the receivers, who submitted a report on the operation of the plant and the business since they have been in charge. It is claimed that more than \$1,000,000 additional capital would be necessary to finance the company properly if it was decided to continue operations. No financial interests have been found that would undertake to underwrite that amount.

The claims against the company are approximately \$1,900,000 although the amount is not fixed because of contingent liabilities as a result of many contracts for parts and bodies. All of the larger creditors were represented at the meeting. Judge Oscar W. Newman and Judge Schroth, representing the receivers have tried to finance the company so that it could continue. Application will be made to Judge J. E. Sater in the Federal Court for permission to sell.

Olympia and White City Exhibitors Total 520

LONDON, Sept. 20 (*By Mail*).—Against an entry of 750 exhibitors for the Paris show next month, Olympia and White City for the November show have a total entry of 520. Car exhibitors will number 139, body building exhibitors 55, tires and wheel makers 39, and accessory and component makers and importers 266.

At the forthcoming Commercial Vehicle Show, Oct. 13-22, there will be 76 exhibitors of vehicles, 92 exhibitors of accessories and components, and 23 of tires and wheels.

There will be closed order as to price of cars and carriage-work ruling during the car show, meaning that the prices published in the official catalogs are to remain untouched for the period of the event. Another rule cancels the erstwhile facilities for trial runs and re-entry to the exhibition. As at last year's show admission to either section of the show will frank the holder of the card of admission to and from both sections free of cost including the journey from or to White City and Olympia.

KENNERDELL RESIGNS

NEW YORK, Oct. 1—Richard Kennerdell, Franklin, Pa., who for eight years has served as chairman of the contest

board of the American Automobile Association, has placed his resignation in the hands of President George Diehl, to take effect immediately.

Chairman Kennerdell during his eight years has been a strong supporter of clean motor contests and his resignation at this time, due to differences of opinion with President Diehl, is a matter of regret. Former Chairman William Schimpf, of Brooklyn, N. Y., who preceded Kennerdell, has temporarily assumed the chairmanship.

Ohio Farmers Active in Light Truck Field

COLUMBUS, Oct. 3—With the coming of colder weather and a slight improvement in industrial conditions, increased inquiries for motor trucks are being received by Columbus and central Ohio dealers. A better tone appeared shortly after the first of September and has been improving since then.

During the dull period there was some business in the light delivery wagons and lighter style of trucks, but the heavier vehicles were very dull. Now there is a decided activity in the heavier lines of trucks, including those of 2½ to 5 tons. Despite the restrictions on the use of trucks which limits the weight and load to 10 tons, deals are frequently made for the purchase of 5-ton vehicles. Owners are confident that the coming session of the Ohio General Assembly will amend the law to make the maximum load 12 tons as it is in many States.

Farmers are showing a disposition to buy trucks, although not of the heavy varieties. The usual farm truck is the 1½ to 3-ton sizes. Farmers have not had as bad a year as they had believed and the corn crop as a whole has come out well.

Dealer Organization Increased by Liberty

DETROIT, Oct. 3—Liberty Motor Car Co. is increasing its dealer organization following a change in distribution plans affecting several important localities. Latest appointments include dealerships in Syracuse, Houston, Wilkes-Barre, Pa.; Pittsburgh, Springfield, Ill.; Terre Haute, Vincennes, Danville, Troy, N. Y., and Windsor, Ont. Spotty business conditions are found by the company throughout the country, though Southern business as a whole is reported better. Open car business is holding up surprisingly for the season of the year, the company ascribing this to popularity of sport models.

HANDS BACK WITH LIGHT CAR

LONDON, Sept. 29 (*By Mail*).—G. W. Hands, founder of the Calthorpe Motor Co., Ltd., at Bordesley, Birmingham, will produce a two-seater light car with dicky seat to retail about \$1,500. It is promised for the Olympia Show period. Hands has motorcycle interests also. The present Calthorpe is one of the best known modern light cars.

Australian Buyers Expect More Cuts

Wool Situation Which Has Been Retarding Sales Factor Shows Improvement

SYDNEY, AUSTRALIA, Aug. 24—Although most of the automobiles have been reduced in price 50 to 60 pounds sterling or \$250 present exchange, this has not caused any stimulation in sales as buyers are looking for something more in price reductions. At the same time most of the automotive dealers in Australia are getting low in stocks of cars, which perhaps accounts for the small price reductions, the majority of the dealers feeling that it was not necessary to make a sacrifice with so small a stock. There are exceptions where some importers are heavily stocked.

Perhaps the main factor retarding the sale of automobiles has been the inability to sell Australian wool. The farmers have not yet recovered from their losses of the previous years. The wheat farmers have all they can do to meet their financial obligations. This year the whole of Australia is well under crop and while some of it has been severely damaged by excessive rains, the average conditions are good. If the farmers receive one-half as much per bushel as a year ago they will be well satisfied and many will be in a position to buy automobiles. It is estimated that about 50,000,000 pounds sterling represents the amount of money the wheat crop will bring and this will have a similar influence in stimulating recovery of trade throughout Australia.

In the wool market prices are a little higher than pre-war prices and are considered satisfactory. Another factor that is improving the wool situation is that the shares of the British Australian Wool Realization Association, Ltd., have been made negotiable on the stock exchange. This association has issued shares to all holders of unsold wool representing the value of the wool so held and after the wool is sold the shares are liquidated or bought back by the B. A. W. R. A. This has aided in the recovery of business and automobiles have commenced to move as a result.

49 Per Cent Franklins Are Enclosed Models

SYRACUSE, Oct. 3—During the first eight months of this year 49 per cent of the cars shipped from the factory of the Franklin Automobile Co. were of the enclosed type, an increase of 9 per cent over the corresponding period in 1920.

Officials of the company say that the demand for enclosed cars is not confined to cities and towns of the North where the climate is severe, for a careful analysis made by factory statisticians has shown that the sedan type is equally popular in California and Maine and in rural sections as well as in cities.

Standard Parts Asks To Pay New Dividend

Permission Sought to Distribute
Among Creditors Second
\$1,000,000 in 60 Days

CLEVELAND, Oct. 3.—The Standard Parts Co., through Receiver Frank A. Scott, has applied to the United States District Court here for authority to pay the creditors another 10 per cent dividend on their claims. The corporation has been in the hands of receivers for more than a year, and Scott's application is received in the financial district as another distinct step toward the ending of the receivership.

If Federal Judge D. C. Westenhaver passes favorably on the application, the company will distribute to creditors \$1,000,000. Approximately 60 days ago Scott distributed another like amount. After paying these \$2,000,000 it is announced that the company will have left in the treasury ample working capital. A hearing on the application to pay will be held on Oct. 15.

Claims Reduced

Undisputed claims against Standard Parts aggregate \$9,197,000, while there were contingent liabilities of \$1,250,000. These, the application states, have been reduced through adjustments by \$510,000 and the receiver believes they will be reduced further. As a result the total claims against the company are placed at approximately \$9,500,000.

There is good news for the small creditors of the company in the application, for the court is asked for permission to pay in full all claims not exceeding \$100. There are 748 such claims, aggregating \$22,619.

Creditors some time ago proposed a plan whereby they would take over the plant, and at the hearing on the initial application for authority to distribute a 10 per cent dividend, a determined effort was made to have the plan adopted, but it failed. The favorable showing made by the receiver is expected to end all efforts on the part of creditors to take over the plant, especially as stockholders regard the plan unfavorably.

The company is receiving many inquiries for its various products, and one of the factory executives says business conditions are very healthy. "We are going into the winter confident that parts and accessories business will steadily grow, and also with the realization that our customers' shelves are practically empty," he states. The company has one or two plants for sale, but the two dividends were paid from liquidation of inventory and factory operations.

DEALERS ASK BANKRUPTCY

NEW ORLEANS, Oct. 3.—Frank & Weinberger, composed of Theodore Frank and Frank Weinberger, who are the local agents for the Premier and Velie cars, have filed a petition in volun-

tary bankruptcy in the United States District Court here through their attorney, Bertrand I. Cahn. The petition lists the liabilities at \$426,846 with assets of \$144,625. Among the larger New Orleans creditors are the Hibernia Bank with a claim of \$90,000, Marine Bank \$20,000 and the Citizens Bank with a claim of \$11,000.

No Excessive Stocks Held in South Africa

NEW YORK, Oct. 1.—Improving conditions in South Africa, with denials that excessive stocks of cars are held in the customs houses, are reported by the National Bank of South Africa. From Pretoria, the bank reports as of July 30 that the Motor Traders' Association has experienced somewhat better conditions in its sales and the stocks of cars are being liquidated, members of the association having reached the stage in some cases when they will have to begin importing again.

"In view of the damaging effect produced by exaggerated reports as to the number of cars in bond at the coast, and more particularly at Cape Town, a member of the association made extensive investigations in the early part of the month (July) and discovered that the total number of cars in bond at Cape Town was only 360," the bank states. The five months ending May 31 saw the importation of 1052 cars, valued at \$371,863, as against 4187 valued at \$1,065,945 during the same period last year.

Tractor Sales Grow Under Harvester Drive

CHICAGO, Oct. 3.—Tractor sales under the force of the International Harvester Co.'s "Tractor-a-Week Drive," one for each of its branch houses, are showing an increasing number and the drive is a success. As a result of this concentration of sales forces on one line there has been a noticeable drop in other lines handled by the company. For instance, motor trucks, which were selling at the rate of 100 a week before the tractor drive was started, have fallen off to 80 and 85 a week.

On the assumption that there will be a decrease in the price of building materials of perhaps 10 per cent between now and spring, it is announced that there will be no work done on the large new factory of the International Harvester Co. at Fort Wayne, Ind., this year.

ALL-AMERICAN NOT SOLD

CHICAGO, Oct. 3.—The factory site and buildings of the All-American Truck Co. was not sold at auction Thursday, as advertised. A second mortgage for \$50,000 controls the situation and the real estate will go to the holder of this claim. This is the third time the company has been in receivership and this settlement of the concern's affairs is said to mark the end.

Favors Wadsworth Bill for Air Control

Satisfactory as Emergency Measure, Coffin Tells S. A. E. in
Urging Legislation

DETROIT, Oct. 3.—The Detroit section of the S. A. E. was urged by Howard E. Coffin at the first fall meeting to take early steps toward recommending to Congress the necessity for immediate action on legislation establishing control of the air. Enlistment of private capital in development of commercial air service, he said, cannot be successfully negotiated until such legislation is enacted.

Coffin commended the bill introduced by Senator Wadsworth of New York as satisfactory from an emergency standpoint, while awaiting the formal report of the American Bar Association on the status of air control. To-day, he said, "the only law effective in this country affecting aviation, is the well known law established by Mr. Newton several hundred years ago."

Laxity Criticized

He criticized the laxity which to-day permits anyone to fly any sort of plane, comparing this with the care exercised in the supervision of elevators in buildings. His talk preceded a showing of the official Army and Navy motion pictures portraying the sinking of the German war ships by Army and Navy air craft.

Dr. H. C. Dickinson of the Bureau of Standards, Washington, spoke on the activities of the department in automotive research and asked for the co-operation of the private research departments of the factories in reaching conclusions. He said much of the study is of general character and should be accessible for the benefit of the entire industry.

The Detroit section will vote at the November meeting on the question of affiliating with the other engineering societies of the city in a general organization, with a central headquarters and a paid secretary. The views of the national society in regard to a movement of this kind will be sought in the meanwhile and announced at that time.

Deny Myles-Standish Injunction Petition

TOLEDO, Oct. 1.—At a hearing in Denver before the Circuit Court of Appeals the Myles-Standish Co. sought leave to ask the District Court for a modification of the sweeping injunction for unfair competition that was granted to the Champion Spark Plug Co. in the U. S. District Court at Omaha on Dec. 3, 1920. The court denied the petition of the Myles-Standish Co., leaving in full form and effect the injunction entered by the District Court.

White Readjustment to Aid Production

Automotive Business in Cleveland District Continues to Evidence Upward Trend

CLEVELAND, Oct. 3—Business is going steadily forward in the Cleveland district, according to many signs that may be read easily.

The White Co. is making certain readjustments in its plant that it was unable to make during the war period or the years immediately following, owing to pressure of business. During this time extensions and additions have been erected which have increased the total floor area from 406,371 sq. ft. in 1914 to 1,271,181 sq. ft.

Sales Plan Successful

In preparation of an early return of normal business a rearrangement of methods is in progress for the purpose of facilitating production, thus placing the company in a better condition to meet requirements. Since the sales department was placed in the hands of a committee of four vice-presidents, each with a definite territory, results have been more satisfactory and August sales were 10 per cent in excess of those for July. September business is keeping up.

The truck business is improving, which is taken as an indication that all lines are in on the revival. The International Truck Corp., for instance, sold more Mack trucks in September in Cleveland than it ever did in any other month in history of the organization.

Parts Business Does Well

Secretary A. O. Williams of the Cleveland Automotive Trade Association, which is a clearing house for reports on business, says that the parts and accessories business is going well. The Poulson Rubber Co., which manufactures tire accessories, is working night and day at its plant. The Sterling Manufacturing Co., producing the Sterling ammeter, has more orders than it has facilities for manufacturing at present. The Pennsylvania Rubber Co., the A. J. Cooper Co., the M. & M. and Philetric report that salesmen are bringing in orders and that there is no longer the grind and strain that was felt some time ago in doing business.

As for the retail business, the Nash-Ohio Co. is behind with deliveries; the same is true of the Paige, Packard and Buick 4. The Dodge agency sold more trucks in September than it has done in any previous month of the local company's history.

BLACK & DECKER SALES PLAN

BALTIMORE, Oct. 3—An arrangement to sell its product on a time payment basis has been made by the Black & Decker Mfg. Co. The plan, which was put into operation Oct. 1, permits dealers, garagemen and other users of the

company's products to buy them on the basis of 23 per cent down and the balance in monthly installments for a six months' period without interest charges. Jobbers, through whom Black & Decker products are sold exclusively, will receive immediate cash payment in full from a banking corporation which is handling the financial end of the plant. In case a buyer wishes to pay cash he will receive the usual discount allowed by his jobber for immediate payment.

Austin Motors Denies Rumors of Shut-Down

LONDON, Sept. 20 (*By Mail*).—A rumor was afloat on the Stock Exchange last week-end to the effect that the Austin Motor Co. at Birmingham would close part of its works until spring, the inference being that the step was due to lack of orders. Sir Herbert Austin has promptly denied this rumor and has asserted that the business is moving steadily upward.

There is fair hope that the company will maintain its program and chassis types unaltered for two or three years, concentrate on improving details and strive to get down sales costs, which, of course, must be preceded by a drop in manufacturing costs.

Mexico Gets Largest Shipment of Ford Cars

DETROIT, Sept. 30—The largest single shipment of Ford motor cars to Mexico was made by the Houston branch on July 26, when 340 cars were shipped to Cia Importadora del Auto Universal, S. A., Mexico City. It is noted in connection with the shipment that special railroad arrangements had been made to speed it along, as under existing conditions in the Mexican money market, it is imperative to get the cars delivered to buyers as quickly as possible.

Foreign automobile conditions are reported brighter by the company. All foreign plants had an output of 6140 for August. At Buenos Aires production made the most important increase that it has for some time. Ford Motor Co. of Canada turned out 2773 cars and trucks. Production in all plants, domestic and foreign, totaled 118,100 for August. Kearny, N. J., had the highest production of the assembly plants, with Detroit second and Philadelphia third.

DISTRIBUTOR IN BANKRUPTCY

DETROIT, Oct. 3—W. D. Block Motor Co., Marmon and Lexington distributor of this city, has filed a bankruptcy petition in Federal Court setting forth liabilities of \$261,691.67 and assets of \$127,294.11. In the petition as filed by Louis F. Dahling, following a stockholders' meeting of Sept. 20 it is declared that "many defaults are occurring in the payment of notes and it is necessary that collection be enforced or the cars recovered from defaulting purchasers." The Security Trust Co. has been named receiver.

Avoids Receivership By Dealer Contracts

Suit Dismissed Against Automot- ive Corp., Tractor Manufact- urer Operating Toledo Plant

TOLEDO, Oct. 3—After the Automotive Corp., Toledo, manufacturer of tractors and about to place upon the market a small light automobile, had shown that it had valid dealer contracts for \$2,500,000 worth of tractors, a suit, brought by a stockholder in Federal Court asking for a receiver, was dismissed.

Previous to this action the officers of the company against whom state warrants charging violation of the "blue sky" law had been sworn were released from this charge by the municipal court here where the cases were marked off the docket.

President Hulin of the corporation produced the books of the company at the hearing before Special Master Fordyce Belford. After this an agreement was drawn by which the case was withdrawn by the stockholder and he was guaranteed release from all liability for damages arising out of the bringing of the suit.

The company has a new plant here. It has manufactured only a few tractors and is not operating up to production at the present time.

National Tractor Show Is Postponed a Week

CHICAGO, Oct. 3—The dates for the seventh National Tractor Show and Educational Exposition to be held in the new exhibition building at the Minnesota State Fair Grounds, Minneapolis, have been changed from Jan. 30 to Feb. 4, to the following week, Feb. 6 to 11 inclusive.

The dates originally fixed made a conflict with the Chicago Automobile Show, the result of which would have been that some accessory and parts manufacturers would be compelled to choose between the two shows in the matter of making an exhibit.

The postponing of the tractor show one week later will avoid this conflict and will make the tractor show run concurrent with the Minneapolis automobile show. It is reasonable to believe that the tractor show will profit to some extent at least by reason of the crowds which will be drawn to Minneapolis for the motor show.

SAXON CUT SPURS BUSINESS

DETROIT, Oct. 3—Decreased prices in Saxon cars effective last week have resulted in a spurt of business which officials believe will continue for some time. Several new distribution contracts have been signed, and the company finds several points now selling where business had been dormant in recent months.

Production Running on Even Keel

Bulk of Business In Enclosed Models

October Plans of Most Companies Impose Heavy Burdens on Body Makers

DETROIT, Oct. 5—Production of cars in the Detroit district during September continued on practically the same basis as August production with a slight decline in low and medium priced cars due, according to executives, to price uncertainty caused by a recurrence of price reductions among a number of important lines.

In the higher priced field practically every company reported increases over August, Cadillac, Lincoln, Packard, Wills-Ste. Claire and Roamer coming under this listing. Packard reports a favorable gain in truck business which promises to be sustained in October. Other heavy duty truck manufacturers also find increased cause for optimism.

Cadillac will increase its output in October to 75 or 80 a day. The new model is declared to be meeting with favorable sales response generally.

Packard will continue its September production of Twin and Single sixes in October.

Lincoln came through with its first 400 month and is looking to better this in October.

Wills-Ste. Claire reports September shipments running as high as 30 daily and looks for continuance in October.

Barley September business surpassed August and the company looks for a 50 per cent increase in October.

Studebaker, which again came through with an 8900, or capacity, month, is the notable exception to the general decrease in the medium priced car field. Sales are holding up strongly and the company looks for high production in October, but it declares difficulty is being experienced in getting enclosed bodies.

With most of the companies the large bulk of October business is going to be in enclosed models and this is imposing a heavy burden on the part of body makers to meet the demand. All of the larger body factories are working to the limit of capacity. An indication of the rush of body business is seen in the fact that despite the opening of the Fisher Ohio Body Co.'s new plant in Cleveland, where bodies for all companies in that district will be made, all of the Detroit plants are in full operation. Briggs Bros. has doubled its capacity by taking over the Everitt plant here. American Body is working extra shifts to meet demands.

Hudson under the influence of lower prices has enjoyed a better sales month

than in August and looks for still further increased business in October following the announcement of its new models. Increased production schedules have been laid down for both Hudson and Essex.

Hupp will increase its production in October after a falling off in sales in September.

Liberty looks for a stronger business in October with the additions made to its sales organization during September.

Saxon also, with an increased distributor organization and a new low price level on its cars, looks for a strong October business.

Reo declares September car business to have been fair but light truck business at a high mark. October business will be benefitted by the introduction of its new models and it looks for a general brightening.

Oldsmobile is pursuing an aggressive sales campaign among its distributor organization, making special effort to promote sales of enclosed cars. September shipments ran at the rate of 55 daily and October business is looked to exceed this if weather conditions are favorable.

Paige during September maintained an average of about 60 per cent of normal in its production schedule, which was under the August average.

Scripps-Booth continues on its schedule maintained during the past several months.

Oakland business after a vigorous start in September, fell off toward the last of the month. The month was the second best the company has experienced this year. October business is expected to react favorably.

Ford Motor Co. finished September with a total of 95,000 cars, a decrease of about 20,000 under August. Sales are continuing high, the company asserts, and 90,000 has been set as the schedule for October. This may be altered, the company declared, to meet either an increase or decrease in sales.

Dort business in September was quiet but general improvement is looked for in October, the South holding out a special field for sales, the company finds, owing to improved conditions in that section and also better weather.

Dodge business in September held to its regular schedule of 550 daily and this schedule will be continued for the first part of October.

HOLDS SALE CONFERENCE

CLEVELAND, Oct. 4—The annual sales conference of the McGraw Tire & Rubber Co. has been held at the company's general offices here with managers from all sales districts in attendance. The purpose of the meeting was to adopt new distributing policies which have been furnished for the ensuing sales year.

Jackson Creditors Agree to Combine

Informed That 14 Companies Will Be Included But Identity Not Disclosed

NEW YORK, Oct. 5—Creditors of the Jackson Motors Corp. agreed at a meeting in Jackson last week to accept the proposal that the Jackson company be included in a proposed \$50,000,000 automotive merger. While they accepted the plan the creditors were left completely in the dark as to the companies with which Jackson will be associated. They simply were informed that 14 corporations would be included in the merger.

The promoters of the consolidation are surrounding their negotiations with secrecy until the plan is presented to the stockholders of the companies whose directors have agreed to the plan. Several companies mentioned in this connection were approached in reference to the combination but declined to enter it.

It has been reported that the Salisbury Axle Co. would be included but this statement was denied emphatically by C. A. Dana, who is president of the Spicer Mfg. Co. which owns the common stock of Salisbury. Strength was lent to the report by the fact that a certificate of dissolution of the Salisbury Axle Co. was filed at Albany a few days ago but Dana explained that this company was an old corporation which preceded the one whose stock they purchased of the Spicer company and that this dissolution was merely a formality. The Spicer company also controls the Parish Mfg. Co. and the same interests dominate the Sheldon Axle Co.

Ralph Van Vechten, vice-president of the Continental and Commercial Bank of Chicago, who was reported to have been prominent in the negotiations for the merger, has telegraphed AUTOMOTIVE INDUSTRIES stating that he has not been connected with the proposal.

K-W Ignition Loses Suit Against Ford

CHICAGO, Oct. 5—The United States Court of Appeals to-day reversed a decision of Judge A. B. Anderson at Indianapolis, giving the K-W Ignition Co. a verdict of about \$2,000,000 against the Ford Motor Co.

The Ignition company charged that the Ford factory had manufactured for its own use ignition cells on which the K-W company held a patent.

The Appellate Court held that the defendant had not been notified of any infringement of patent rights.

Uniform Motor Laws Aim of New England

State Representatives Plan to Lead Way Toward Effecting Agree- ment on Policy

BOSTON, Oct. 3—New England is going to take the lead in efforts to bring about uniformity of motor laws as a result of a meeting here when representatives of the states gathered and listened to addresses on topics along those lines. While the meeting was joined with the National Safety Council, the conference was distinct in that those attending were not members of the organization.

John N. Cole, chairman of the Department of Public Works for Massachusetts in charge of motors and highways, presided. He stated, in outlining the scope of the conference, that motor trucks were the most important part of present-day transportation because of their flexibility.

"Lack of uniformity has caused and is causing more accidents every day than people realize" said Secretary Harry Meixell, Jr., of the Motor Vehicle Conference, New York. "This is due to the fact that it is a most difficult task to get cities, towns, counties and states to agree upon laws where one is required to give away any of its authority to another."

He outlined the Uniform Motor Vehicle law, and told of the movement to interest states in the project. The movement is gaining slowly, and it is expected a number of states will adopt it eventually, because of the vital need for it.

D. C. Fenner of New York, chairman of the motor vehicle conference committee, pointed out that motor truck transportation on the highways could be rendered far more safe if it were made subject to scientific laws uniformly adopted by all of the states and rigidly enforced.

MAIBOHM MAKES CHANGES

SANDUSKY, OHIO, Oct. 3—The Maibohm Motors Co. announces the following price changes effective immediately:

	Old Price	New Price
5-passenger phaeton.....	\$1,575	\$1,395
Roadster	1,575	1,395
Sport roadster.....	1,675	1,395
4-passenger sport.....	1,850	1,595
Coupe	2,395	2,295
Sedan	2,395	2,295

A year ago the price of the phaeton was \$1,695, with the others in proportion, making a total drop of \$300 in twelve months.

WHITE HICKORY TRUCKS CUT

ATLANTA, GA. Oct. 4—A 50 per cent reduction has been announced on all models of White Hickory motor trucks, manufactured in Atlanta by the White Hickory Wagon Mfg. Co. This truck is

extensively used in the Southeast. Following is the new scale of prices:

	Old Price	New Price
Model E, 1 ton.....	\$2,450	\$1,225
Model H, 1½ ton.....	2,750	1,375
Model K, 2½ ton.....	3,350	1,675
(150 inch wheelbase)		
Model K, 2½ ton.....	3,450	1,725
(168 inch wheelbase)		

Davis Reduces Prices on Four of Its Models

RICHMOND, IND., Sept. 30—Effective Oct. 2 the following prices are announced on the 1922 models of the Davis Six, manufactured by the George W. Davis Motor Car Co.

	Old Price	New Price
Touring	\$1,895	\$1,695
Sport	2,095	1,995
Fleetaway	2,150	2,050
Man o' War.....	2,150	2,050

The reductions are from the prices which have been current since last January. Increased production on the three last models together with decreases in the current costs of materials have made the cuts possible. Production at the factory has been steady throughout the year and for the first eight months of 1921 passed the production records for the same period last year.

NEW REVERE PRICES

LOGANSPOUT, IND., Oct. 5—New prices have been announced by the Revere Motor Car Co. as follows:

	Old Price	New Price
Roadster	\$4,850	\$3,850
5-passenger touring.....	4,650	3,850
4-passenger touring.....	4,650	3,850
Sedan	6,500	4,500

ALLEN CARS REDUCED

COLUMBUS, OHIO, Oct. 1—The Allen Motor Car Co. has reduced prices on its touring, roadster and sedan models. The old and new prices follow:

	Old	New
Touring	\$1,385	\$1,195
Roadster	1,385	1,195
Sedan	2,195	1,845

BEGGS LOWER

KANSAS CITY, Sept. 30—The Beggs Motor Car Co. has made the following reductions on its models:

	Old Price	New Price
5-passenger	\$1,775	\$1,520
Coupe	2,675	2,320
Sedan	2,775	2,420

GRAMM-BERNSTEIN DROP

LIMA, OHIO, Oct. 3—The Gramm-Bernstein Motor Truck Co. has reduced the price of its Model 10 speed truck from \$1,495 to \$1,365.

VELIE DOWN

MOLINE, ILL., Oct. 3—Effective immediately, the Velie Motors Corp. announces reductions on its five passenger touring car and roadster, Model 34, from \$1,385 to \$1,235, f.o.b. this city.

Decreased Thefts Due to Dyer Law

Vigilance of Authorities Con- tributes to Reducing Number Stolen in 1920 10 Per cent

ST. LOUIS, Oct. 3—Thirty thousand and forty-six automobiles were stolen in 1920 in 28 "index" cities of the country and 21,273 of them recovered, according to the annual compilation of the National Automobile Dealers' Association. The number stolen was 3012 less than the number stolen in 1919 but was 2001 more than the number stolen in 1918. In 1918 cars unrecovered were 21 per cent of the number stolen; in 1919 they were 26 per cent and in 1920 29 per cent.

Chicago took the lead from New York with the number stolen, although a higher percentage of cars remained unrecovered in New York. New York had 5179 stolen; Chicago 5527. New York recovered only 2717 of her stolen cars while Chicago recovered 4340. Dayton had the unusual record of having recovered more cars than she had stolen.

The Pacific Coast cities kept up their yearly good work of recovery. There were 4877 cars stolen in Los Angeles, San Francisco, Oakland, Portland and Seattle and 4175 recovered. The unrecovered cars were 16.4 per cent of the total stolen, or approximately 50 per cent of the average for the country.

The number of thefts in the cities covered decreased 1919-1920 about 10 per cent while the general increase in the number of automobiles throughout the country was about 20 per cent during the same period. A considerable part of this decrease is attributed by the N. A. D. A. to the deterring effect of the national motor vehicle theft law (the Dyer law) which was put through Congress at the instance of the N. A. D. A. and to more stringent laws in the States for the punishment of motor car thieves.

However, a good part of the better showing is due also to vigorous activity of the peace authorities.

The subject of theft is being watched vigorously by the N. A. D. A. and the N. A. C. C. because of the theft insurance rates now having become so high.

American Bosch Occupies Own Home in New York

NEW YORK, Sept. 30—The new home of the New York branch of the American Bosch Magneto Corp. is a ten-story building erected in the center of automotive sales and manufacturing interests in the city. It is of fireproof construction, being built of steel, stone and concrete throughout. Four of the floors are occupied by the corporation and the upper parts of the building will be rented exclusively to automotive concerns. A large service station and installation garage is located in the basement and the sales and stock rooms, occupying the ground floor, are spacious.

Moline Equity Kept By Willys-Overland

Will Be Considerably Diluted
According to Statement of
Banker Interested

NEW YORK, Oct. 5—Since the plan for the reorganization and refinancing of the Moline Plow Co. was announced there have been persistent reports that "Willys is out of Moline." It can be said on authority that John N. Willys personally never was interested in the plow company except as a subsidiary of the Willys-Overland Corp. Under the reorganization Willys-Overland will retain its equity in the Moline Plow Co. but as one of the bankers interested expressed it, "this equity will be considerably diluted."

In September, 1918, G. A. Stephens, former president of the Moline Plow Co. made an announcement which said:

"The Stephens interest, except F. G. Allen and family and F. G. Allen remaining in charge of the business, have sold their holdings in common stock to John N. Willys for \$150 per share and will receive in payment therefor stocks paying 7% cumulative preferred dividends quarterly, in following proportions of the following companies: Willys-Overland, 55%; Electric Auto-Lite Corp., (now Willys Corp.), 30%; Curtiss Airplane & Motor Corp., 15%.

"The Stephens family has arranged with the purchaser of their stocks that the opportunity is offered to all holders of the Plow company common stock to exchange their stock for the above stocks in the proportion mentioned, and to receive the above stocks in the ratio of 1½% for their common stock.

"The Willys-Overland Co. reserves the right in the case of fractional shares to pay either scrip or cash. It is part of this agreement that dividends on the three preferred stocks mentioned shall accrue from the date of agreement, Sept. 6, 1918. We are advised that the policy of the new management will not be to pay cash dividends on the common for a period of years in order to permit improvements of plants, to take care of the largely increased output and the building up of sufficient reserve and to safeguard this extended business."

As a result of these negotiations the Willys-Overland Co. acquired slightly more than 82 per cent of the Moline Plow Co. common stock.

On the basis of \$150 a share, the Stephens interests received \$12,300,000 worth of Willys securities. Since that time there has been a very material decrease in the value of the Willys stocks. In the absence of any definite information regarding the amount of stock he owns personally in his own companies it is impossible to estimate the personal losses of Willys on the Moline transaction.

Good Winter Business Sighted in Arkansas

LITTLE ROCK, ARK., Oct. 3—Automobile men in this section of the country are now breathing the air of refreshing optimism. While most sales have been of the more conservative

priced cars, there have been many highest priced cars sold, and dealers over the State are expanding by making improvements and adding new lines, and evidently planning for a big fall and winter business. The cotton and rice crop is coming along and is bringing a good price.

Dealers report that collections are decidedly better, with cash not as hard to get as in the summer. Three months ago it was predicted that not more than 35 per cent of the 1920 debts would be liquidated. At present there is every indication that payments will exceed 75 per cent and that this year's cotton and rice crop, with other farm products, will aid very materially in putting men, who have been carrying burdens of debt, back on a sounder financial footing.

Collins Obtains Peerless Control

(Continued from page 686)

significant fact that during his entire service there was never even a suggestion of a strike or labor disturbance of any kind in the Cadillac plant. This record resulted from his intimate, personal co-operation with his co-workers in all departments, which created a spirit of loyalty in the manufacturing and selling organizations.

Collins began his automobile career back in the early days of the industry as general manager of the Kansas City branch of the Buick Motor Co. He directed Buick distribution in this important territory with such pronounced success that, three and one-half years later, he was called to Flint, to assume the bigger responsibilities of general sales manager of the Buick company. His achievements in helping to rehabilitate the Buick company, in improving the car, strengthening the factory and distributing organization, multiplying Buick sales many times and putting Flint on the industrial map, have already been recorded among the most sensationally successful accomplishments in automobile history. He later was appointed assistant to W. C. Durant as president of General Motors Corp., maintaining offices in New York and Detroit for the management of the large affairs of the corporation, before becoming president and general manager of the Cadillac Motor Car Co.

On two previous occasions the control of Peerless changed. In 1915 it passed to a New York City syndicate headed by Harrison Williams. The preferred stock was purchased for \$105 a share and the common stockholders were paid \$175 a share and in addition a \$50 bond per share. In 1918, B. G. Tremaine, F. S. Terry and certain associates went into the open market and purchased back control of the company, the managing interest thereby returning to this city. The plant during the boom times of the war and immediately following had 400 men on the payroll. Tremaine retires from Peerless to devote all of his time to the business of the General Electric Co.

INDUSTRIAL NOTES

Clark-Turner Piston Co. of Los Angeles is establishing factory branches at important distributing centers throughout the country with the purpose of effecting a twenty-four hour service. Appointments of these distributors who will handle warehouse stocks cover Kansas City, Freeport, Ill., and New York City, with another to be made for the Southern States.

The American Motor Parts Co. is transferring its unit from the R. & V. motors plant at East Moline, Ill., to the new factory located in the Ideal Milling Co. plant, with no appreciable reduction in its production schedules. R. & V. Motors disposed of a large section of its plant to the Troy Laundry Machine Co., which is now taking possession.

Ajax Rubber Co., Inc., is operating its Trenton, N. J., plant at practical capacity with three eight-hour shifts a day, and its Racine, Wis., plant somewhat slower on a two eight-hour shift basis, representing a substantial increase over earlier in the year. Shipments are said to equal production with finished goods on hand at the lowest point possible.

The Fulton Tractor Co., a new organization to manufacture a tractor invented by J. F. Fulton which uses no cog gears, has purchased the plant of the American Window Glass Co. at Anderson, Ind. Production of twenty tractors a day at the end of a ninety-day period is promised by the company, which also asserts that it is fully capitalized.

The Raleigh Motors Corp. of Bridgeton, N. J., manufacturer of the Raleigh car, has secured a plant at Reading, Pa. J. R. Sutterlee, president; Leroy Sutterlee, secretary and George Quimby, production engineer, who visited Reading recently, state that they will start production as soon as their equipment arrives and the plant is remodeled.

B. F. Goodrich Co., Akron, shut down the first three days of October for inventory taking purposes. It is believed that following this production will be gradually increased to a more normal basis.

The Eagle Motor Truck Corp. has dedicated a large addition to its plant in St. Louis. Invitations were extended to all stockholders, truck owners and operators in the city.

Kearney & Trecker Corp., Milwaukee, has removed its New York branch office to Room 371, the Hudson Terminal Building, 50 Church Street, New York City.

Buckeye Reliner Producing Co., Lima, Ohio, is preparing to increase the national and international orders and double the amount of its working force.

Hare's Motors, Inc., announces the removal of its executive offices to the Canadian Pacific Building, New York City.

The American Forge Co., Chicago, has changed its corporate name to the AmForge Co.

DODGE GETS WINDSOR PLANT

WINDSOR, ONT., Oct. 5—Dodge Bros. Motor Car Co. of Detroit has leased a wharf and building from the Canadian Pacific Railway in Windsor, Ont., and is assembling cars there. It is understood that a Canadian company is being incorporated and the location of an automobile factory in Canada is probable.

Farmers Opposing Reimportation Tax

Possibility That Graham Measure May Be Defeated Though Senate Bloc

WASHINGTON, Oct. 4—Opposition to the so-called Graham Resolution, which would impose a tax of 90 per cent on re-importations of surplus war supplies, including motor trucks and automobiles, has been expressed by the Oklahoma Farmers Union and the State Farm Bureau Federation. The resolution is now pending on the Senate calendar owing to the fact that objection by Senator Pomerene and others prevented its passage before the summer recess of Congress.

It is the contention of the Farm Bureau Federation that many concerns importing automobiles have contracted to deliver to the farmers automobiles at \$500 each which now sell in this country for \$1,100 or more, and this purchase price includes ocean freight and commission. The organized farmers insist that they can obtain motorized equipment for their farms at a saving of 50 per cent of the wholesale price by purchasing the reimported goods. As a consequence, they are against the Graham Resolution, which would protect the motor truck manufacturers and dealers in this country from this form of foreign competition. If other farm organizations join with these two groups, it is barely possible that the so-called agricultural bloc in the Senate will defeat the Graham measure.

The prospect of delay in the enactment of the Graham bill is particularly disturbing at this time to dealers who have felt the effects of this competition. The Graham measure was designed to provide protection during the time the tariff bill was under discussion. There is a measure in the House tariff bill which provides for assessment of heavy duties on re-imported war materials. It was incorporated in the bill because of the country-wide agitation conducted by organized automobile dealers and manufacturers.

Poughkeepsie Factory of Fiat on Market

NEW YORK, Oct. 5—The factory at Poughkeepsie formerly used by the Fiat Automobile Co. has been placed on the market by individuals who now own it. The plant originally was used for the assembling of Fiat cars. Most of the parts were imported from the parent factory at Turin, Italy, but some of them were obtained in this country. With the outbreak of the war importation of parts became impossible and the assembling of cars ceased. The Fiat company now is importing complete cars. The parent company is not directly interested in the Poughkeepsie plant.

September Shipments Show Slight Decrease

NEW YORK, Oct. 5.—Reports of September shipments of cars and trucks made to the National Automobile Chamber of Commerce by its members show that there was a decrease of 4 per cent as compared with last month, but they totaled 85 per cent of September, 1920. In the same month last year shipments were 16½ per cent less than in August. The September shipments compare more favorably with the same month last year than those of any previous month for 1921. The shipment figures by months for this year and last follow:

	Carloads		Driveaways		Boat	
	1920	1921	1920	1921	1920	1921
January	25,057	6,485	29,283	3,185	....	93
February	25,505	9,986	43,719	7,507	....	99
March	29,326	16,287	57,273	9,939	....	75
April	17,147	20,187	64,634	14,197	....	1,619
May	21,977	18,608	74,286	15,193	....	2,381
June	22,516	20,269	60,746	18,834	8,350	3,947
July	23,082	19,470	52,342	15,320	8,702	3,725
August	23,386	20,350	34,060	14,290	7,095	3,565
September	20,804	20,150	24,431	13,550	5,469	3,580

Branches Supplant Two Studebaker Distributors

CLEVELAND, Oct. 4—George E. Willis, who has been in charge of the Studebaker's export business and but recently returned from a trip to Germany and Russia, has become head of the Studebaker distributing agency in the Cleveland district, succeeding Aaron Du Roy and Joseph O. Hahn in the active management of the Studebaker Sales Co. The following officers were elected at a meeting of the directors: A. R. Erskine, president; H. A. Briggs, vice-president; George E. Willis, general manager; F. C. Kenny, treasurer, and A. G. Rumpf, secretary. Regarding plans, Willis says, "Aside from the change in officers, the Studebaker Sales Co. of Ohio will be conducted along the same lines as heretofore. Eventually it is the intention of the Studebaker corporation to establish a direct factory branch in this city and to liquidate the Studebaker sales company."

PITTSBURGH, Oct. 4—According to Aaron Du Roy, he and Joseph O. Hahn have sold their entire holdings in the Studebaker Sales Co. to the Studebaker Corp. of America. Du Roy has handled the Studebaker line in the western Pennsylvania territory since 1909. He and Hahn formed the sales company five years ago and handled the Studebaker in the State of Ohio, western Pennsylvania and part of West Virginia, the Studebaker corporation being interested in the company. The B. F. Stout building has been leased for a long term of years to house the factory branch which will supplant the sales company.

PRIZE FOR BEST AIR MOTOR

NEW YORK, Oct. 4—A dispatch from Paris says the French committee for aeronautic propaganda has decided to create a prize of one million francs for the commercial aviation motor which best satisfies tests, in a competition to be arranged, in point of durability, regularity, simplicity, dismounting and in regard to upkeep.

Snead Vice-President, H. P. Macdonald, Dies

JERSEY CITY, Oct. 5—The death is announced of H. P. Macdonald, a vice-president of Snead & Co., manufacturers of Snead cushion drives. He was born in Louisville, Ky., in 1880 and was graduated from the Massachusetts Institute of Technology in 1901. He went with Snead & Co. the same year, serving successively as assistant superintendent, general superintendent, chief engineer and vice-president. He was a member of the Society of Automotive Engineers and several other engineering societies.

Macdonald was responsible for a series of inventions relative to the electrical heat treating of ferrous and non-ferrous metals by means of internal resistance. This system was used extensively during the war for the heat treating of steel tubing for airplanes made by the Allies.

Edward M. Huggins, formerly assistant chief engineer of Snead & Co., has been promoted to chief engineer and Ira S. Snead, general sales manager, has been elected to the office of vice-president left vacant by the death of Macdonald.

Suggests Dealers Get Rediscount Rate Data

WASHINGTON, Oct. 5—Suggestion has been made by Governor Harding of the Federal Reserve Board that automobile dealers in the principal cities inquire of their banks as to what the effect of lower rediscount rates at Federal Reserve banks would be on rates of interest charged by local member banks and then furnish the board with a synopsis of findings. This data will be used by the Federal Reserve Board Advisory Council, which is a statutory body authorized to make recommendations in regard to discount and rediscount rates. Their recommendations had much to do with tightening up credit on automobile dealers and manufacturers in the spring of 1920.

Indications are that the banks will bring about changes to ease the credit situation.

Seiberling States Plans For Future

Crisis in Past Came Because of Failure to Anticipate Reaction

CLEVELAND, Oct. 4—Frank A. Seiberling of Akron, who built the Goodyear Tire & Rubber Co. from a puny corporation to the leading concern of its kind in the world, and who at 61 is now starting to build up another gigantic business, came to Cleveland last week and gave to *Finance and Industry*, a business paper, his plans for his industrial regeneration.

True, Seiberling has aged considerably since the day he borrowed the capital to start the Goodyear plant, but he is just as full of initiative, optimism and fight as he was when he made the initial endeavor.

Although his new start upward is just in its infancy, he already has practically acquired plants which will provide 5000 casings and 6000 inner tubes daily. In the closing days of his career at the Goodyear plant he was expanding production by building new plants and factory additions when the market for raw materials and finished products was at the peak. He did so because the market was at his heels daily, demanding more and more tires.

Tells of Collapse

The crisis came to him, he says, because of a failure to anticipate the day and the hour when the reaction would come. Continuing about his collapse at the Goodyear plant, Seiberling says:

"We all sensed the coming crisis; but no one saw it. The business was expanding rapidly. Why, in the first half of 1920 we were in volume of business, 50 per cent ahead of the first six months in 1919. Manufacturers were tramping on our heels to get tires. We tried to keep pace with the requirements of the trade of our old customers. Demand kept mounting; no one foresaw the precise moment when it would end. Well, it arrived. We tried to get money to help us past the crisis in anticipation of a broader program of financing. We found that it was impossible to do any long time financing in the latter part of 1920. We were forced to temporary financing. The purpose of such financing was to save the community of Akron and the cotton mills and other interests with whom we had contracts from the calamity of a receivership for Goodyear. I did not want the responsibility for forcing the cotton mills into bankruptcy placed on Goodyear. We made the best terms that we could and saved the company. I went thru with that bargain to the last. Officially I got out of Goodyear on Friday May 13. I stayed on two weeks longer to clear up certain matters. I gave all the assistance I could, because—well you see—I nursed Goodyear up from nothing to leadership in its line—and it meant something to me."

In the last days of his leadership of Goodyear, Seiberling was expanding and building up his factories at the fag end of a boom period. Now we see him in a different rôle. He has started out to

buy when others are out of the market. That means low prices for the factories.

Here's a quotation on this point from Seiberling: "The year 1922 will see wonders performed in improving processes and perfecting units. It is apparent that by taking old plants at low valuations, the obsolescence will have been charged off. With these plants I will be contented for the present. Some day I hope to build the most efficient rubber plant in the world."

There's plenty of cheer in this statement by Seiberling: "We are on the eve of startling developments, both chemically and mechanically, in the tire business. These developments will be of great value to the tire business and the public, for they will reduce the cost of operating cars on pneumatic tires."

Country on Economic Basis

The speaker asserted that he and his brother, C. W. Seiberling, are re-engaging in the rubber business for two reasons: First, because it is the business they know and, second, it offers the best future opportunities. Seiberling then reviews the boom times of the war and the abnormal demand that brought great expansion. Now, he says, the country is getting down to an economic equilibrium. He predicts that the number of automobiles and trucks in use will grow next year from 9,000,000 to 10,000,000 and that it will steadily increase to 15,000,000.

He says that the growth in the number of automobiles does not mean that the tire industry is to grow in units in the same proportion.

"On the contrary," he states, "the development in the tire industry is likely to be in the quality of the product—increasing the mileage of tires. By that I mean a reduction in the cost per mile run; so that the number of tires produced may increase very little over the number heretofore turned out."

"We have acquired a plant at New Castle and have made an offer for the Portage Rubber Co., near Akron. With these two plants we would have a capacity of 5000 casings and 6000 tubes a day. I am proposing to take over the Portage plant for \$750,000. It will be paid in preferred stock of a corporation to be organized to own that plant. The common stock of the Portage plant will go to a holding company that I am organizing for operating purposes. The holding company will own the New Castle plant in fee, having paid for it in common stock at its present appraised value. Later I plan to offer securities to the public to the extent necessary to cover requirements of working capital."

GEORGIA RAILROAD SUFFERS

ATLANTA, Oct. 3—Automobile truck competition may force the Gainesville Midland Railroad of Georgia into the scrap pile, according to a recent letter to a newspaper at Athens, Ga. written by W. B. Veazy, receiver for the road. The territory in northeast Georgia served by the railroad produces ample business to make it pay, but the extensive use of the motor trucks for inter-city transportation in that section, Veazy states, is slowly ruining the business of the railroad.

Tests Aid Sales in South Africa

Spring Season Now Realized As Time for Excellent Business Possibilities

JOHANNESBURG, Sept. 15. (*By Mail*)—The month of August saw the finish of the Transvaal Automobile Club Reliability Trials from Johannesburg to Durban. The start was made on July 30 and the trials extended over three days. The distance to Durban is 410 miles and the roads passed over were in varying states of repair. Altogether the trials have done a great deal for the cause of motoring in South Africa. A Buick Six, driven by A. Williams, General Motors representative, took first place in the professional class and was awarded 197.6 marks out of a possible 200. The weight of the car was slightly over 2½ tons loaded and the gasoline consumption 23.45 m.p.g. A Talbot was placed second, with a Scripps-Booth third.

As an aftermath to these tests several attempts were made to lower the road record from Durban to Johannesburg. In its class the Hupmobile stands first at 14 hours 41½ minutes for the distance of 410 miles. The difference in altitude between Durban and Johannesburg is 6000 feet. The Chevrolet holds the best time for its class with 15 hours 21 minutes to its credit. A Nash stock model was driven from Pretoria to Durban and back without a stop, a distance of 892 miles, in 36 hours.

Further Cuts Expected

The cause of transportation has received impetus from the different events mentioned above and dealers are making preparations to capture as much of the spring trade as possible. On account of the genial climate that prevails in South Africa dealers have not made spring a special season for sales, but they have realized that it is a season when much excellent business can be done.

Still further price cuts have been notified by some of the tire companies and gasoline has come down in price, no less than two reductions being made recently. The reduction of running costs will help the dealers with sales this year, as running costs have been a bar to a number of sales during the past twelve months. Car prices appear to be stable for a time now, but buyers have been nervous of late on account of further price cuts being expected by them. Dealers, however, are advising the public that prices will remain on the present level for some time.

English cars and trucks are entering the market and creating competition. The Wolseley cars and Leyland trucks are being extensively placed throughout the country. Wolseley are building special colonial models for this country and the Leyland people are adapting their trucks to suit conditions here.

MEN OF THE INDUSTRY

William M. Sweet, a director and vice-president of The Klaxon Co., has relinquished his other duties with the General Motors Corp. to devote his entire attention to the Klaxon interests as vice-president. From 1907 to 1916 Sweet was general manager of the M. A. M. A., resigning to become assistant to A. P. Sloan, Jr., president of the United Motors Corp.; later also becoming assistant secretary and assistant treasurer. In 1918, when United Motors was consolidated with General Motors Corp., Sloan became vice-president of the latter corporation and Sweet continued as his assistant, later becoming assistant secretary of the corporation. Sweet is a vice-president, director and member of the executive committee of Bearings Service Co. Since 1910 he has also been a director and member of the executive committee of the A. A. A., and during the past five years has been vice-president of the Metropolitan Council of that association.

Murry Irwin has been elected president of the Advance Manufacturing & Tool Co., making screw machine products and automobile parts in its plant in Cleveland. **R. H. Lord** has been chosen secretary and treasurer. The other two directors of the corporation are Joseph G. Fogg, former president, and H. W. Sissen, both of whom are lawyers. Irwin, before coming to Cleveland, was sales manager for the Lewis Spring & Axle Co. at Jackson and general manager for the Adams Axle Co. at Findlay, Ohio. The Advance company was incorporated with a capital of \$200,000 and all of the stock has been sold. It has been in production in Cleveland for three years.

A. M. Leoni, who brought the P-T tractor wheel to this country from Italy some years ago and who later designed the 3-4 plow Tioga farm tractor, has secured an option on the American patents on the Pavesi road and farm tractor, which was described in AUTOMOTIVE INDUSTRIES of Dec. 18, 1919, and Jan. 1, 1920. Mr. Leoni plans to produce a machine specially suited to orchard work and rice cultivation.

H. J. Edwards has been appointed supervisor of the Detroit district for the Maxwell Motor Sales Corp. and the Chalmers Motor Car Co. Edwards was connected for many years with the Union Carbide & Carbon Co., both as sales manager and as general manager of several of their subsidiaries, notably the Prestolite Co. Prior to that he was eastern manager for the Moline Plow Co.

Fritz R. Lindh, formerly chief engineer of the Graton & Knight Mfg. Co., in which capacity he was in charge of all field research and testing at the factory as well as all field engineering service, has joined the sales organization of the Chicago Belting Co. He will be in charge of the Pittsburgh direct factory branch with headquarters in that city.

Chas. E. Wagner has joined the sales staff of the Maxwell Motor Sales Corp. and the Chalmers Motor Car Co. Wagner has been with the Willys-Overland Co. for the past nine years, serving in many capacities ranging from that of factory representative to distributor.

H. R. Sturgeon, who was connected with the John N. Willys Export Corp. as advertising manager and previously had been in the advertising department of the Willys-Overland Co. at Toledo, is now associated with the John O. Munn Co. as vice-president.

H. R. Averill has become associated with the Cole Motor Car Co., Indianapolis, in the capacity of special representative. Averill

has spent twenty odd years in the automotive industry and was recently identified with the National.

E. E. Aldous, for twenty-seven years connected with the American Steel & Wire Co., Chicago, has been named the company's representative in the St. Paul-Minneapolis-Duluth territory with headquarters at St. Paul.

Curtis W. Keegin has been appointed by the Cincinnati Ball Crank Co. as district manager for Michigan. Keegin was formerly with the Hyatt Roller Bearing Co. and Continental Motors Corp.

George C. McMullen, formerly Pacific coast representative of the Timken Roller Bearing Co., industrial division, has been placed in charge of the division.

BANK CREDITS

Written exclusively for AUTOMOTIVE INDUSTRIES by the Guaranty Trust Co., second largest bank in America.

Last week's statement of condition of the Federal Reserve Banks showed a continuation of the improvement in the reserve ratio which has been unbroken since early in July, with the exception of the first week in September. Gold reserves increased \$14,838,000 from the figure of the previous week, total reserves increasing \$15,589,000 to \$2,878,685,000. Deposits increased \$25,795,000, while Federal Reserve notes in actual circulation declined \$17,480,000. The ratio of total reserves to deposit and Federal Reserve note liabilities combined rose, accordingly, from 68.7 per cent to 69 per cent. Total bills on hand increased \$21,041,000, as compared with a decline of \$48,123,000 in the previous week.

There were no striking developments in the local money market last week. The range of rates on call loans was from 5 per cent to 6 per cent, compared with 4½ per cent to 5½ per cent the previous week. The higher range may be attributed to preparations for the usual month-end settlements. Outside the Stock Exchange loans were made at 4½ per cent. Quotations for time money remained unchanged, with only a light volume of transactions effected. Corresponding stability was shown in the market for commercial paper.

The Government report of the condition of the cotton crop as of Sept. 25 established a new low record of 42.2 per cent. The new indicated yield is 6,537,000 bales, representing a reduction in estimated yield of 500,000 bales from the estimate of Aug. 25. It is evident that approximately normal consumption in the next twelve months would draw heavily upon the large carry-over from last season.

The number of commercial failures in the United States in September, as reported by *The Credit Guide*, declined about 5 per cent compared with failures in August. Average liabilities also declined. The volume of bank clearings last week was substantially greater than in the previous week. These figures are indicative of the rather general improvement in trade which has been under way for some weeks.

N.A.C.C. Considers
Problems of DealersUsed Car Question and Finances
Held Most Important in
Discussions

NEW YORK, Oct. 6—Problems of vital concern to the automobile dealer were considered by the directors of the National Automobile Chamber of Commerce at their monthly meeting yesterday and the discussion was continued at the annual members' meeting to-day. Solution of the used car question was considered of most importance and bearing directly on this was the subject of dealer finances. It was contended that manufacturers are taking their losses on their inventories and that dealers are taking theirs on used cars.

Reports received from all sections of the country on business conditions indicated that trade is best in the East and South but that truck sales are improving in Nebraska, Missouri and New York. There still is a scarcity of credit for dealers.

Five more applications than last year were received for space in the New York show. Space was drawn this afternoon. All the applicants will be taken care of in this city but it probably will be necessary to leave a few out of the Chicago exposition.

J. A. Haskell, vice-president of the General Motors Corp., was elected a director to succeed W. C. Sills.

Durant Motors of New York was elected to membership in the chamber.

A report on tire standardization, accepted by the Society of Automotive Engineers and the Rubber Association of America, was submitted.

DUEY NAMED RECEIVER

NEW YORK, Oct. 6—Edward R. Duey has been appointed receiver for the Rubber Corp. of America in an action filed by the Equitable Trust Co. which holds a note for \$70,000. Liabilities are listed at about \$900,000 and the assets are approximately \$1,030,000. It was said that the object of the receivership was to conserve the assets of the company so that it either could be liquidated or reorganized in conjunction with the Empire Tire & Rubber Co. of Trenton.

BURT, REPUBLIC DIRECTOR

NEW YORK, Oct. 6—At the annual meeting of stockholders of the Republic Motor Truck Co., Inc., the only change made in the directorate was occasioned by the resignation of A. H. Ide of Troy, N. Y., and the election in his place of T. A. Burt of Urbana, Ill., who will represent large holdings of Republic stock in the Chicago district.

PETITION AGAINST WAYNE

DETROIT, Oct. 6—An involuntary petition in bankruptcy has been filed in Federal Court against the Wayne Tractor Co. by creditors.

METAL MARKETS

WHILE minor price changes in the steel market are a probability rather than a possibility, the consensus of opinion in conservative quarters is that no radical making over of values will take place during the last quarter of the year. There are those who see in the rate of operations which has been attained by sheet mills justification for further advances, but the sentiment among representative producers of a diversified line of steel products (for many of which there is still very little demand) is to let well enough alone. If the smaller sheet mills, many of which are dependent upon other producers for their supply of sheet bars, should succeed in elevating the sheet market further, they will be called upon to pay proportionately increased prices for sheet bars, so that in the end they would not be so much the gainers. Moreover, advances in the case of many steel products imply advances in the wages of operatives, which are based on a sliding scale figured on the preceding month's average sales levels. Such advances are hardly conducive to what adjustment remains to be made in the matter of wage schedules generally. In spite of the insistent demands for immediate downward revision of freight rates, there is little likelihood of worthwhile results being achieved during the remainder of the year. The fact is altogether too frequently overlooked that the slight rebounds which have taken place of late in steel prices were not so much due to the enhanced demand as to the fact that deflation in the pig iron and steel markets was based on anticipation of at least partial deflation of freight rates and fuel prices and, when these failed to materialize after a reasonable length of time, the slightest revival of demand was bound to result in a recoil of prices. Automotive interests have been consistent in their attitude toward the market in the last few months and continue to be so, refusing to commit themselves beyond the tonnages which their operating schedules call for. While the desire to avoid carrying a large amount of raw material undoubtedly accounts in a large measure for this attitude, this policy also appears to be the most sagacious one to follow amid the present conditions in the steel market.

Pig Iron.—Although pig iron interests continue to nurse assiduously the "little boom," as they call the return of more representative buying and further advances are prognosticated, restraint is being more and more imposed by increased production, a number of furnaces heretofore idle preparing to resume operations. Automotive foundries display slight interest in offerings and are not perturbed by the avowed unwillingness of furnace representatives to book orders for deferred shipment.

Steel.—"Independents" have advanced their price for sheet bars to \$32.50, which affects chiefly non-integrated sheet makers. The Corporation's sheet bar price is nominally \$35. Some of the Youngstown district sheet mills, flushed by the return of 66% to 75 per cent operations, are obtaining a bonus of \$1 to \$2 a ton for immediate deliveries, overnight shipments, which they were only too glad to make a few weeks ago, having disappeared. Automobile body makers still have considerable tonnages of sheets coming to them at prices below the present market. Demand for No. 22 gage full finished body sheets has eased off, the market remaining quotably unchanged at 4.35c., Pittsburgh. Cold-drawn steel bars are in fair demand by passenger car builders, but only small lots

are wanted. The same is true of cold-rolled strip steel. Bolts and nuts are in routine inquiry with prices rather flexible.

Aluminum.—The market continues weak and entirely in buyers' favor.

Copper.—Domestic consuming demand has improved and, in addition, producers are supporting the market, weaker holders of resale lots having previously liquidated their stocks.

Tin.—Primary markets display more optimism, which London encourages.

Lead.—The market continues steady, with battery makers buying somewhat more freely.

Zinc.—Fair demand for galvanizing purposes is noted. Brass mills still have large tonnages of scrap to fall back upon.

FINANCIAL NOTES

Ford Motor Co. of Canada did business to the amount of \$37,836,473.40 in the year ending July 31, 1921, according to Gordon M. McGregor, vice-president and general manager. After provision had been made for all expenses and for income tax the net profits transferred to the surplus of the company were \$2,121,501.11, in addition to which should be added \$231,127.96, balance remaining in the 1920 business profits tax reserve. Total assets are given as \$18,835,405.69. The output for the year was 46,832 automobiles and 3063 tractors, compared with 55,616 cars and 2335 tractors for the year previous.

Kelly-Springfield Tire Co. declared the regular quarterly dividend of 3 per cent on the common stock, payable Nov. 1 to stock of record Oct. 14. Regular quarterly dividend of 2 per cent on the 8 per cent preferred stock also has been declared, payable Nov. 15 to stock of record Nov. 1.

Erie Tire & Rubber Co., Sandusky, is solvent with assets of \$800,000 in excess of liabilities, according to a complete audit of the company's affairs from its inception until June 30 of this year, filed by Receiver H. R. Greenlee.

Moon Motor Car Co. board of directors has declared the regular quarterly dividend of 1½ per cent on preferred stock outstanding, payable Oct. 1.

Hupp Motor Car Co. has declared the regular quarterly dividend of 2½ per cent on the common stock, payable Nov. 1 to stock of record Oct. 15.

Fisher Body Co. of Ohio has declared the regular quarterly dividend of \$2 on the preferred stock, payable Oct. 11 to stock of record Oct. 4.

Stockholders Approve
Sunnyhome Dissolution

NEW YORK, Oct. 5.—Stockholders of the Sunnyhome Electric Co., one of the units of the United Motors group of the General Motors Corp., have approved a resolution to dissolve the company. Claims must be filed by Oct. 19.

General Motors Corp. denied last May that it proposed to sell the Frigidaire Corp., the Sunnyhome Electric Co. and other units not directly connected with automotive products. It was stated then that the sale of the Frigidaire refrigerator would be extended through the sales organization of the Delco Light Co. and that the Sunnyhome company would be consolidated with the Delco company. The dissolution of Sunnyhome is the final step in the consolidation.

Trade to Far East
Is Well Under Way

Orient and Latin-America Markets Held Most Important in Foreign Field

NEW YORK, Oct. 4.—That the Far East and Latin-American markets were the most important in the foreign field was the consensus of opinion expressed here to-day by export managers of the National Automobile Chamber of Commerce at the first monthly luncheon of the present season. The meeting to-day was called especially to introduce William I. Irvine, trade commissioner of the automotive division of the Bureau of Foreign and Domestic Commerce, to the local exporters.

Irvine, after outlining the work the new division hopes to perform and asking the co-operation of the automotive companies, requested the opinion of the members as to which markets should receive particular attention at this time and which likewise could be counted as offering the greatest potential trade for the American companies. Both the Orient and Latin-America were suggested by the exporters present, some of them stating that Latin-America was the more important at this time while others stood out for the Far East. All were positive, however, that these sections should receive careful attention and that sales efforts should not be slackened the slightest. That conditions were improving in each territory and that a resumption of business on a larger scale was imminent was the apparent belief of each speaker.

Irvine plans to leave Washington shortly after the new year on an investigating trip throughout the world.

To Buy Portage Plant
with Preferred Stock

AKRON, Oct. 5.—F. A. Seiberling, who will purchase the plant and equipment of the Portage Rubber Co. of Barberton, Ohio, for \$750,000, announces that payment will be made in preferred stock of the corporation which is to be organized. The common stock of the Portage company will go to a holding company which is being formed for operating purposes. The holding company also will own the plant of the New Castle Rubber Co.

It is proposed later to offer certificates to the public to the extent necessary to cover working capital requirements. The two plants have a combined capacity of about 5000 casings and 6000 tubes daily.

U. S. TRUCK DIVIDEND

CINCINNATI, Oct. 6.—The United States Motor Truck Co. has declared its regular quarterly dividend of 1½ per cent. The company reports that in the first four days of October it booked and had on hand more unfilled orders than in any like period in the past eight months.

Calendar

SHOWS

- Sept. 28 - Oct. 8—New York, Electrical Exposition, 71st Regt. Army, Electric Equipment, Machinery and Vehicles.
- Nov. 14-19—Jersey City, Second Annual Automobile Show of Hudson County Automobile Trade Association. Fourth Regiment Armory.
- Nov. 27-Dec. 3—New York, Automobile Salon, Hotel Commodore.
- January—Chicago, Automobile Salon, Hotel Drake.
- Jan. 7-13—New York, National Automobile Show, Madison Central Palace. Auspices of N.A.C.C.
- Jan. 28-Feb. 2—Chicago, National Automobile Show, Coliseum, Auspices of N.A.C.C.

- Feb. 6 to 11—Seventh National Tractor Show and Educational Exposition, Minnesota State Fair Grounds, Minneapolis.
- Feb. 6 to 11—Winnipeg, Can., Automotive Equipment Show, Western Canadian Automotive Association.
- Feb. 20 to 25—Louisville, Ky., Louisville Automobile Show, Auspices Louisville Automobile Dealers Association.

FOREIGN SHOWS

- Oct. 5-16—Paris, France, Paris Motor Show, Grand Palais, Administration de l'Exposition Internationale de l'Automobile, 51, Rue Pergolèse, Paris.
- Oct. 10-22—Olympia, England, Truck Show. Nov. 4-12—Car Show. Nov. 28-Dec. 3—Motorcycle Show.

- Nov. 4-12—London, British Motor Show, Society Motor Mfrs. and Traders.

- November 7-14—Paris, Seventh International Exposition of Aerial Locomotion in the Grand Palais of the Champs Elysees, Held by the Chambre Syndicale des Industries Aeronautiques.

- Nov. 26 - Dec. 3—Shanghai, China, Automobile Show.

- March, 1922—Santiago, Chili, Annual Automobile Show.

- May, 1922—Quito, Ecuador, Agricultural Exposition, celebrating Centenary of Ecuador. Automotive Section.

- Sept. 1922—Rio de Janeiro, Brazil, Automobile exhibits in connection with the Brazilian Centenary Association Automobilista Brasileira.

CONVENTIONS

- Oct. 12-14—Chicago, Twentieth Annual Convention National Implement & Vehicle Ass'n.
- Nov. 15-16—New York, Convention of Factory Service Managers, National Automobile Chamber of Commerce.
- Nov. 15-17—Kansas City, Second Annual Meeting of American Petroleum Institute.
- Dec. 27-29—Chicago, American Society of Agricultural Engineers, Auditorium Hotel.
- Jan. 17-20, 1922—Chicago, American Road Builders Association.
- S. A. E. MEETINGS
- Detroit, Oct. 21, Nov. 18, Dec. 23, Feb. 24, March 24, April 28, May 26.
- New York, Jan. 10-13, 1922—Annual Meeting.

Northwest Analysis Puts Wyoming First

Percentage of Increased Car Registrations in That State Slightly Exceeds Oregon

PORTLAND, ORE., Sept. 30—If a comparison of the rate of increase in the use of motor vehicles may serve as a criterion the State of Oregon is at present enjoying a greater degree of prosperity than any other State of the Pacific Northwest, excepting Wyoming, according to Sam Kozer, secretary of state for Oregon, who has made public figures which he obtained through a sweeping analysis of the situation in Arizona, Colorado, Idaho, Montana, Nevada, Oregon, Utah, Washington and Wyoming.

"Registration of motor vehicles in Oregon for the first seven months of 1921 show a greater percentage of increase in comparison with the total registrations during the year 1920 than is shown by the available official records of any other western state except Wyoming, and eliminating California, for which similar records are not available," said Kozer.

Such a comparison shows, his report indicates, that during the first seven months of 1921 there were registered in Oregon 105.3 per cent of the number of cars registered during the entire previous year of 1920. Figures for the other States show the following percentages: Arizona 95.24 per cent, Idaho 93.58 per cent, Montana 89.61 per cent, Utah 100.84 per cent, Washington 90.63 per cent, Colorado 96.4 per cent, Nevada 99.05 per cent and Wyoming 105.75 per cent. The last three mentioned States have provided figures only to cover the first six months of 1921 and thus would make a slightly better showing if July, 1921, registrations were also included.

A study of motor vehicle registrations in proportion to population, also made by Kozer, shows that in this regard

Washington is in the lead among the far western States, excluding California, for which statistics are not available for such a comparison, while Oregon is third. Giving his figures on this feature of his study Kozer says:

"Official figures received from eight other western states show that during the first seven months of 1921 Arizona registered one motor vehicle to every 9.67 persons, Colorado one for every 7.27 persons, Idaho one to every 8.49, Montana one to every 9.05, Nevada one to every 7.39, Oregon one to every 7.54, Utah one to every 10.55, Washington one to every 7.14 and Wyoming one to every 8.6 persons. The states mentioned thus rank in the following order in ratio of motor vehicles to total populations: Washington, Colorado, Oregon, Idaho, Wyoming, Montana, Arizona, Utah."

Twenty-three Makes for Commodore Salon

NEW YORK, Sept. 30—Twenty-three makes of American and foreign high grade cars will be exhibited at the automobile salon which will be held at the Hotel Commodore, this city, from Nov. 27 to Dec. 3 and at the Drake Hotel, Chicago, coincident with the National Automobile Show there the latter part of January. There will also be ten custom body builders. Because of the demand for space cars will be exhibited in the lobby and on the mezzanine balcony of the Commodore as well as on the entire second floor.

COVENTRY MAKES NO RETURN

LONDON, Sept. 16 (By Mail)—The receiver and manager of the Coventry Premier (Limited) since it went into involuntary liquidation has issued a notice to the stockholders pointing out that the proceeds are insufficient to repay the debentures in full, so that there will be no return to either class of shareholders. The company's assets were absorbed by the Singer interests in Coventry. The latter's output is a light car and its report recently issued shows a good return on the capital.

Kansas City Shows Accessories Gain

Cars Also in Demand—Commodities with Recognized Name Have Largest Demand

KANSAS CITY, Sept. 30—The upturn in the automotive industry of this territory is reflected in the monthly bulletin of the Federal Reserve Bank, which shows a gain of about 16 per cent in distribution of accessories in August, over July. There is still a deficiency of more than that amount from the distribution of August, 1920, partly taken up in decline in prices. September, judging from casual reports, is showing a marked increase over August, in both accessories and cars. One distributor reported the best August business in his branch's history; and many distributors are having good success, while retailers are in some cases having larger volume in cars than ever before.

The distributors and dealers who are enjoying the largest business are those with established plants here, handling well known cars, whose prices, whether high or low, have been readjusted. Expensive cars seem to be selling proportionately as well as less expensive cars.

From many diverse quarters, the report comes that commodities having the benefit of public or trade knowledge of the name and quality are being asked for. Clothiers, for instance, are turning to brands which they are sure of, through their long acquaintance with names and reputations.

INDIANA TRUCK DISSOLVED

MARION, IND., Sept. 30—The Indiana Truck Corp. has wound up the affairs of the Indiana Truck Co. which it succeeded with the same management. The company dissolved was incorporated in 1906 and was succeeded by the present company in 1916.